

THE IRON AGE

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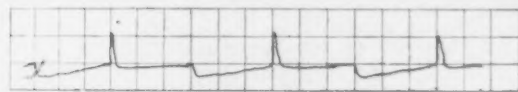
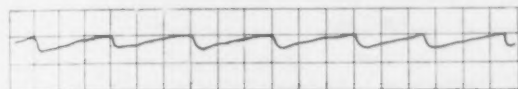
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Open-Hearth Furnace Design

Reversing Valves and Their Effect on Efficiency—Chimney Areas and Heights

BY A. D. WILLIAMS*

REVERSING valves for regeneratively fired furnaces have been a source of much trouble. Many different valves have been designed and placed upon the market, and a number of different flue ar-



Figs. 1 and 2—Pyrometer Diagrams of Stack Temperatures. Abnormal conditions showing sudden upward kick in Fig. 2 are due probably to air leakage and the combustion of checker gases passing along the flue toward the stack

rangements have been devised, to eliminate the reversing valve and accomplish the reversal with a multiplicity of mushroom valves and dampers. The simple Siemens butterfly valve was the first four-way valve used on

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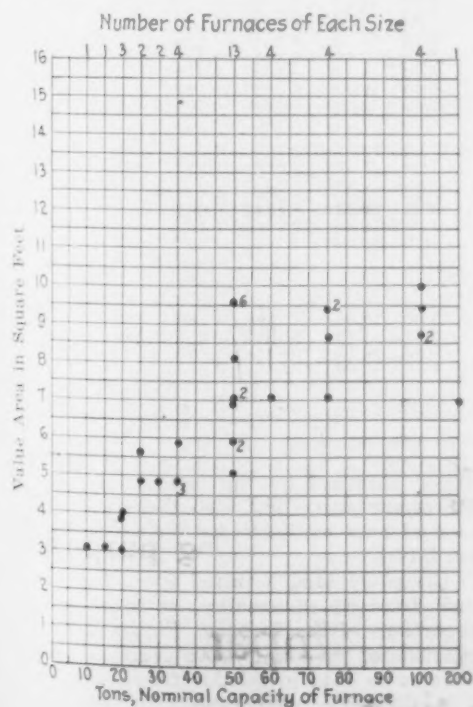


Fig. 3—Gas Valve Areas Spotted

these furnaces. In use, however, exposed to the hot gases on one side, and the cool gas or air passing to the regenerators, it soon warps and becomes leaky. These leaks permit air to pass direct to the stack and cool down the waste gases, or if used for gas there is continual leakage of gas, which either burns in the valve or in the stack flue.

While many reversing valves are water sealed, most of these, during the operation of the valve, in common with the butterfly valve, open a direct connection, practically the full area of the valve from gas main or air to the stack. A few valves have been designed which

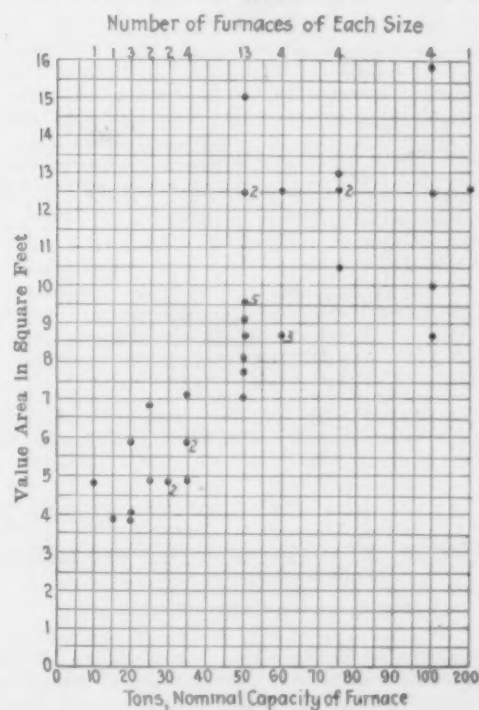


Fig. 4—Air Valve Areas Spotted

cut the furnace, gas and air entirely off from each other and the stack, but these valves have not come into extended use.

Water sealed valves are used extensively. As long as the seal holds they are tight, but there are usually structural limitations to the depth of the seal. When exposed to gas pressure on one side and the stack depression upon the other the seal is unbalanced, and may readily be broken by surges or explosions. In some cases a considerable water area is exposed to the entering gas or air as well as to the waste gases.

Producer gas and stack gases, being several hundred degrees hotter than boiling water, will absorb a

considerable amount of moisture from a very small area of water surface. With all of these valves the sealing lip must be raised, to clear the water surface and the port rims, whenever the valve is operated. From the time the seal is broken until it is re-established the full suction of the stack acts to pull air or gas, and in some cases both, into the stack.

produced. The water seals in the valves increased the amount of moisture in the producer gas 1 per cent. As the water seal depends upon its water supply, a very slight stoppage breaks the seal. Frozen water

TABLE 1
Reversing Valves

Nominal Diameter Valve	In.	Ft.	Mm.	Nominal Area of Valve		
				Sq. In.	Sq. Ft.	Sq. Meters
18	1.50		450	254	1.77	0.164
21	1.75		525	346	2.40	0.223
24	2.00		610	452	3.14	0.292
27	2.25		685	572	3.98	0.369
30	2.50		760	706	4.91	0.456
33	2.75		840	855	5.93	0.554
36	3.00		915	1017	7.07	0.657
40	3.33		1000	1256	8.73	0.808
42	3.50		1070	1385	9.62	0.894
48	4.00		1220	1809	12.57	1.168
54	4.50		1370	2290	15.90	1.477
60	5.00		1525	2827	19.63	1.823
66	5.50		1675	3421	23.76	2.210
72	6.00		1830	4071	28.27	2.630

With some valves the furnace itself is directly connected to the stack through both regenerators at reversal, so that a portion of the stack pull tends to draw air in at the doors. This may or may not be seriously objectionable, according to the distance between the valve and the furnace, and the rapidity with which the valve may be operated.

Effect of Absorbed Moisture

Moisture absorbed from water seals is a direct loss of the amount of heat required to evaporate it and superheat it to the temperature at which it passes out

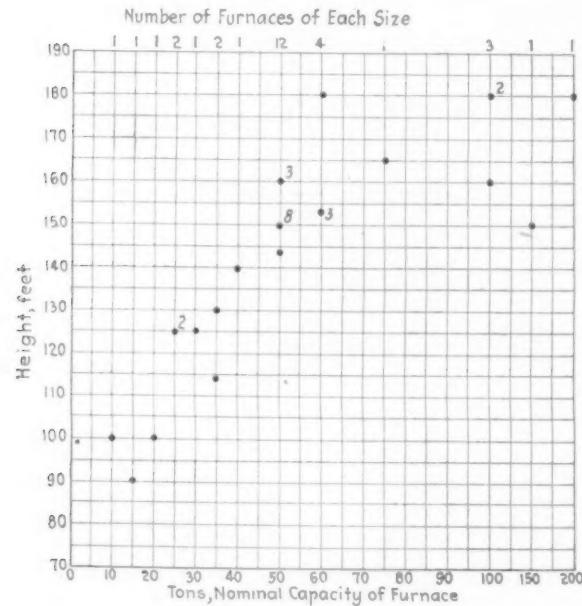


Fig. 5—Stack Heights Spotted

of the regenerator to the stack. In addition, its dissociation probably occurs in the checkers, which may release some oxygen to combine with other combustibles at this point. The reactions here are complex, as certain hydrocarbons dissociate in the checkers, as well as CO₂. A further increment of moisture occurs in certain elements of the charge, and an open-hearth furnace is not particularly efficient as a dryer. At the same time, moisture is carried in by the air supply.

All of this water leaves the regenerator for the stack as highly superheated steam, and its amount is considerable, particularly with large furnaces. In "The Heat Balance of the Open-Hearth" by Sidney Cornell, (*Chemical and Metallurgical Engineering*, May, 1913,) the weight of moisture passing in the flue gases was about 26 per cent of the weight of ingots

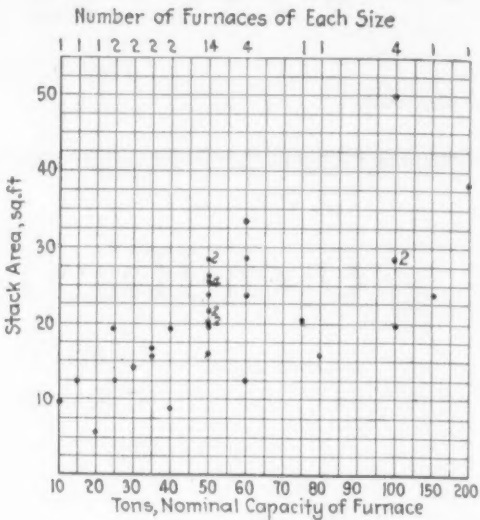


Fig. 6—Stack Areas Spotted

lines in winter frequently cause the superintendent to consign the plant to the tropical regions, particularly when they occur on a cold Sunday morning.

Reversing Valves and Chimneys in Practice							
Nominal Furnace Capacity, Tons	Valve Area		Sq. Ft. per Ton		Chimney		
	Gas, Sq. Ft.	Air, Sq. Ft.			Height, Ft.	Bore, Sq. Ft.	Sq. Ft. per Ton
10—1	3.12	4.87	0.312	0.487	100	9.62	0.962
15	3.12	3.12	0.208	0.208	90	12.56	0.837
20—A	3.90	3.90	0.195	0.195	100	....	....
20—3	3.07	4.00	0.154	0.200	....	....	....
20—D	3.90	5.90	0.195	0.295	....	....	....
20—4	....	....	....	....	....	5.85	0.293
25—4	4.90	4.90	0.196	0.196	125	12.56	0.502
25—3	5.65	6.90	0.226	0.276	125	19.64	0.786
30—5	4.90	4.90	0.163	0.163	125	14.2	0.473
30—4	4.90	4.90	0.163	0.163	125	14.2	0.473
35—2	5.90	5.90	0.169	0.169	....	....	....
35—A	4.90	5.90	0.140	0.169	114	17.0	0.487
35—1	4.90	4.90	0.140	0.140	130	15.9	0.474
35—D	4.90	7.10	0.140	0.203	....	....	....
40—7	....	....	....	....	....	9.0	0.225
40—4	....	....	....	....	140	19.64	0.491
50—4	7.06	7.06	0.141	0.141	150	23.7	0.474
50—10	7.06	15.00	0.141	0.300	....	21.5	0.430
50—11	5.94	9.18	0.119	0.184	150	26.27	0.525
50—8	9.60	12.50	0.192	0.250	150	28.27	0.565
50—13-15	9.60	9.60	0.192	0.192	150	25.8	0.516
50—16	9.60	12.50	0.192	0.250	160	20.0	0.400
50—X	5.22	7.75	0.104	0.155	....	....	....
50—4	8.13	8.13	0.163	0.163	....	....	....
50—19	9.60	9.60	0.192	0.192	150	20.0	0.400
50—5	7.00	9.52	0.140	0.190	....	....	....
50—D	5.90	8.70	0.118	0.174	....	....	....
60—13	7.06	12.58	0.118	0.210	180	33.18	0.553
60—3-5	7.06	8.72	0.118	0.145	153	28.27	0.471
75—1	9.42	13.00	0.126	0.173	....	....	....
75—A	9.42	12.56	0.126	0.167	....	....	....
75—3	8.70	12.56	0.116	0.167	....	....	....
75—D	7.10	10.50	0.095	0.140	....	....	....
75—2	....	....	....	....	165	20.36	0.271
80—1	....	....	....	....	....	15.8	0.198
100—3	....	....	....	....	....	19.6	0.196
100—H	10.00	10.00	0.100	0.100	180	28.25	0.283
100—E	8.75	8.75	0.088	0.088	180	50.0	0.500
100—4	9.42	15.90	0.094	0.159	160	28.25	0.283
100—D	8.70	12.60	0.087	0.126	....	....	....
150—1	....	....	....	....	150	23.7	0.158
200—4	7.00	12.56	0.035	0.063	180	38.50	0.193

Water vapor absorbed by the flue gases reduces not only their temperature, but also the stack draft and the amount of heat available for the waste-heat boiler to convert into steam.

As to the valve area required for a furnace, there is as much diversity in practice, as there is with the other proportions of the furnace. Figure 3 is a graphical comparison of reversing valve practice, while Table 2 shows the same data in tabular form. The reference numbers in the table correspond with those given in

preceding articles, which have appeared in *Révue de Métallurgie* in 1919 and *THE IRON AGE* in 1920.*

Some of these valves are so heavy as to require electric motors or some other form of power for their operation. In these cases the control is located on a pulpit at a central location on the charging floor in the rear of the furnace. Smaller and lighter valves are operated by cables or levers led into the pulpit. Heavy valves have considerable inertia, and for this reason cannot be operated as rapidly, even by power, as the smaller valves which have lighter moving parts.

Furnaces fired by pulverized coal, natural gas, oil, coke oven gas or tar require reversing valves for the air only, the fuel being reversed by shutting off the jet at one end of the furnace and turning on the jet at the opposite end. Some of these furnaces are supplied with one checker chamber at each end, while others are so constructed, with two chambers at each end, that they may be converted with little difficulty to producer gas firing.

Those furnaces in which the air only is preheated have a slight advantage over those in which both the gas and air are preheated, in that no unburnt gas has to be wasted up the stack at reversal. The amount of fuel lost in this manner depends upon the gas-filled volume between the reversing valve and the port, and the frequency of reversal. When the gas is preheated this loss cannot be avoided.

This gas likewise creates an explosion hazard. When the conditions are right this gas burns and passes up the stack as a puff of flame. Again, if it becomes mixed with air, the mixture being below the ignition temperature, and a portion of this mixture is suddenly ignited, an explosion of more or less violence occurs. These explosions damage the walls of regenerative chambers, flues and waste-heat boilers, opening up cracks, so that large amounts of air are drawn into the system, reducing the stack draft and the output of the boiler, by reason of the lowering of the temperature of the waste gases.

Velocity of Gases Through Valves

One factor in regard to valve area that meets with little consideration is the velocity of the gases passing through the valve. In addition, most valves involve a change in direction of flow, totaling 360 deg., 180 deg. in the valve and two 90-deg. changes in the flues. When a stream of flowing gases goes through a passage involving changes in area, velocity changes are involved. The velocity of flow in the normal section of the flue may be represented by $V_{min.}$, and in the contracted area of the valve by $V_{max.}$ The corresponding velocity heads will be $h_{min.}$ and $h_{max.}$. That is, a velocity head = $h_{max.} - h_{min.}$ will be required to produce the increase in velocity. The pressure in inches of water required to produce the increase in velocity will be:

$$p = 0.192 (h_{max.} - h_{min.}) d_t$$
 in which d_t = weight in lb. per cu. ft. of the gas in motion at the temperature t deg.

The coefficient of contraction varies from unity, when the areas of the two passages are same, to 0.83 when the area of the smaller passage is 0.01 of the area of the larger passage. This slightly increases the pressure required, but ordinarily a large margin is available to cover this. The loss of pressure due to changes of direction may be expressed by the formula:

$$p = 0.192 r d_t \frac{v^2}{2g}$$

in which:

p = pressure in inches of water column;
 v = velocity in ft. per sec. of the stream of gas;
 g = gravitational constant = 32.2;
 d_t = weight in lb. per cu. ft. of the gas in motion at the temperature t deg.;
 r = a function of the angle through which the stream is deflected.

The following values are given by Weisbach for short bends in pipes:

Angular change	20 deg.	40 deg.	45 deg.	60 deg.	80 deg.	90 deg.
Coefficient r	0.046	0.139	0.188	0.364	0.740	0.984

This last loss, due to directional change in passing through the valve, amounts to 180 deg. in the valve itself and 90 deg. in the flues each side of the valve.

*Jan. 1, page 35; Jan. 8, page 119; Jan. 29, page 317; Feb. 12, page 475; March 18, page 805; April 29, page 1225; May 27, page 1510; Aug. 5, page 319.

For this reason changes of diameter of valve of 6 in. or so are of comparatively small effect upon operation. These losses vary with the square of the velocity in the valve and the flues. Many furnaces are, undoubtedly, choked by the small area of the valves used, and much operating trouble is doubtless due to lack of consideration of these details.

A valve small enough to choke the furnace is an expensive luxury, as it exacts its toll every minute the furnace is working. Added chimney height or forced draft must be provided to overcome its resistance. There is very little doubt that the erratic working of some furnaces with different weather conditions is largely due to the close balance, between draft and resistance, being disturbed by barometric and temperature conditions. These various losses will be gone into in more detail in the design computations.

Figs. 5 and 6 give a graphical comparison of chimney areas and heights, which are tabulated in Table 2. Open-hearth practice in the United States tends to steel self-supporting chimneys lined with fire brick. Even with waste-heat boilers and induced draft the straight chimney is used, while abroad many of the venturi cone (Prat type) chimneys are used. The chimney is required to carry the waste gases to a sufficient height to prevent their becoming a nuisance, not only in the works, but to its neighbors.

Another factor which must be considered in connection with the draft required to operate the furnace is that the gases must be pulled out of the furnace through the ports, down through the checkers and through the valves and flues. That is, the waste gas end of the furnace is below atmospheric pressure, and there is a constant tendency for cold air to be pulled into the system. When the brickwork is new and tight the leakage of air into the system may be slight, but after a few explosions have shaken things up, this brickwork is liable to leak like a sieve. For this reason, gas samples taken at the base of the stack are liable to show a condition of affairs quite foreign to that which actually exists in the gases leaving the heating chamber or the regenerators.

Many tests and considerable investigation of open-hearth furnaces have been made from time to time at different plants. Tests of this kind cannot be permitted to interfere with furnace operation. They must be carried on night and day over several melts. When it is decided to run such a test, the question of cost must be considered, not only in apparatus but in personnel. A large number of observations and chemical analyses must be recorded and analyzed.

Very slight details are liable to vitiate the value of such tests, and it is extremely difficult to impress upon the assistants available the factors that are really essential. Frequently, in fact, the busy executive is unable to devote to the test scheme the preliminary attention he desires, and as a result only a portion of the data required are obtained. Comparatively few of these test results are made known, hence there is much repetition of the work of others.

Inquiries now before structural steel mills call for 280 tons of steel to be used for the initial unit of the factory-warehouse building to be erected at Youngstown, Ohio, by the Paul J. Kalman Co., a Chicago fabricating interest. The plant will manufacture reinforcing steel and when completed will have an annual consumptive capacity of 70,000 tons of bars.

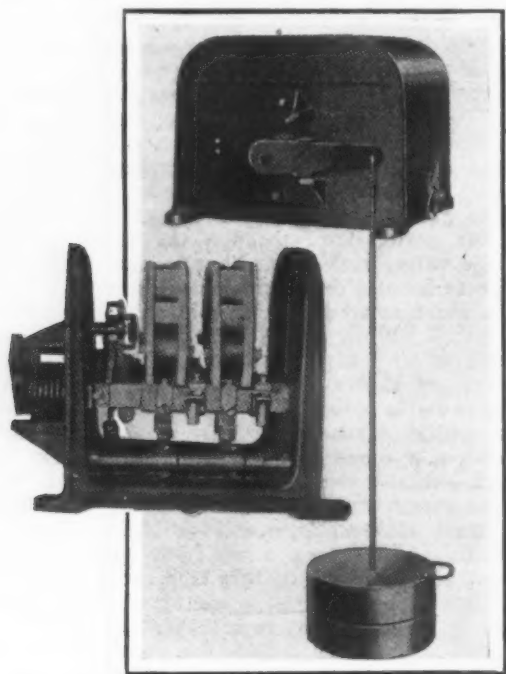
The American Rolling Mill Co., Middletown, Ohio, has made another cut of 10 per cent in salaries and wages. The new schedule was effective Sept 16. The base rate for common labor is now 27c. per hour. The announcement was made that this will be the last reduction in wages to be made this year, regardless of the price of steel.

Molders of the American Steel Products Co., Macomb, Ill., recently struck as a protest against a reduced rate on piece work put into effect by the company. The molders had been earning from \$8 to \$9 a day and in order to meet competition the company found it necessary to reduce this amount to \$6.

Electric Crane Safety Switch

A new crane safety limit switch, designated as type L C, intended to prevent overtravel of the hoist brake and the consequent damage, has been brought out by the Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa. The safety limit guards the equipment irrespective of the kind of control or of the position of the controller handle or brakes. In addition to its safety feature time is saved within the normal operating range of the hoist, as the switch obviates the necessity of approaching the limit of travel slowly and cautiously.

Under normal operating conditions, the limit switch is held in the operating position by the counterweight as shown in the illustration, which overpowers the torsion operating springs, also shown. In case of overtravel the counterweight is raised by the hoisting hook or other moving part, which permits the torsion spring to operate the switch. This disconnects the motor from the line and establishes a closed dynamic braking cir-



In Case of Overtravel, the Counterweight Is Raised by the Hoisting Hook, Permitting the Torsion Spring to Operate the Switch

cuit through the motor armature, motor series field and resistor, which stops the motor, irrespective of the position or type of the controller or brake. The operation of the switch also releases the series magnetic brake which holds the load until the controller handle is moved to the lowering position. As soon as the hook has been lowered beyond the limit the switch is again ready to function as before, as it re-sets itself automatically. The quick-make and quick-break feature of the switch throws it rapidly from the normal to the braking position when approaching the limit and back to the normal operating position when backing out. It will not remain in a partially open or partially closed position and destroy the contacts or fail to function.

The safety limits may be used also on metal mixers, bridges and other applications employing series motors, where it is desired to limit the travel in one direction by applying dynamic braking.

Industrial training, by co-operation between school and shop, has been inaugurated by Pennsylvania State College. A supervisor in each shop gives individual aid to the students working there, on the points where they show weakness. All papers are corrected at the college, and all lessons are sent from there direct to the students. Special text books have been prepared for students in textiles, automobile parts, electrical equipment, iron and steel, machines and tools and other subjects.

Industrial Cost Association

At a meeting of the board of directors of the Industrial Cost Association, held on Sept. 8, the resignation of J. W. Stannard as president and director was accepted and Horace S. Peck, comptroller, S. K. F. Industries, Inc., 165 Broadway, New York, was elected to fill the vacancy. Christopher Haigh, General Electric Co., West Lynn, Mass.; Joseph P. McLean, Pittsburgh Forge & Iron Co., Pittsburgh, and Ernest J. Wesson, W. T. Raleigh Co., Freeport, Ill., were elected directors of the association.

It was decided to hold the fall conference at Pittsburgh, Nov. 2, 3 and 4. The association now has 224 members. The organization has no salaried officers. The board of directors at one time passed a resolution to the effect that at such time as the receipts of the association exceeded disbursements, the secretary-treasurer was to be placed on a salary basis but at no time has this condition existed for a long enough period to justify such action, and it was therefore impossible for this officer to continue to devote his entire time to the association.

In a letter to the membership President Peck explained that for a number of months A. A. Alles, Jr., the secretary-treasurer, through the courtesy of the Fawcus Machine Co. and the Schaffer Engineering Co., devoted his entire time and attention to the affairs of the association and that he still continues to devote as much of his time as possible to this work.

New Plans to Study Drill Steel Breakages

WASHINGTON, Sept. 20.—Plans have been made by the Bureau of Standards and the Bureau of Mines to intensify further study of breakage and heat treatment of drill steel and invitations have been issued to outside experts on the subject, who, it is hoped, will cooperate with the bureaus and act as a consulting committee. Those asked to serve in this capacity are President J. A. Mathews of the Crucible Steel Co. of America; Dr. Van H. Manning of the American Petroleum Institute; B. F. Tillson of the New Jersey Zinc Co.; W. L. Saunders, chairman Ingersoll-Rand Co., and F. W. Benton of the Copper Range Co.

The Bureau of Mines has been conducting research on drill steel at its experimental stations in Rolla, Mo., and Minneapolis, and, having a lack of appropriations to continue them as extensively as necessary is seeking aid through experts in the trade and in the mining industry.

The Bureau of Standards also has been conducting a research with the Bureau of Mines. It is stated that improvements in drill steel have not as yet come up to the standard of those made in the drill themselves and that there has been considerable breakage, causing a cessation in operations in drilling at mines and resulting in heavy costs.

Gain in Employment at Youngstown

August wage distribution by Youngstown, Ohio, industries of \$3,349,974 compares with \$3,323,982 disbursed in July. This is the first gain in payroll at Youngstown in several months. According to a statement issued by the United States Department of Labor, Youngstown leads other cities in the increase in number of persons employed in industry in August as compared with July. Youngstown's gain is 27.7 per cent, whereas the average increase in 65 principal industrial centers is 1.08 per cent. The Department of Labor bases its figures on reports from 1428 firms in the various cities which usually employ 500 or more persons.

During August the Ford Motor Co. made 109,173 passenger cars and trucks in the United States, breaking its former record for a month's output by 211. Total production of Fords in this country since the beginning of this year is 645,192, an average of 80,650 a month for each of the eight months. The average output for each of the 27 working days of August was approximately 4050.

Electric Furnace Progress in 1921

Discussion of the Merits of Dual Voltages for Melting the Steel and for Refining —Heat Losses and Electrodes Considered

—BY E. T. MOORE*

MUCH of the work outlined as a program for research work of necessity involves continuity of operation, a condition which has not been possible to obtain. On this account it has been impossible to complete the work, which anticipated extensive research and the recording of a mass of secured data. However, it is hoped much discussion will result from the suggestions outlined herein, and a much broader scope given to the subject. The plans called for the following lines:

1. A thorough study of the heat losses from electric furnaces.
2. Presentation of operating data on furnace electrodes, according to the electrode specifications drawn up by this committee and presented in a paper before the last convention.
3. An investigation of the merits of dual voltages, and the deleterious effect on the metal, if any, of a relatively high voltage, for melting.
4. Investigation of electric furnace phenomena.

Heat Losses From Electric Furnaces

Considerable attention has been given to the study of heat losses through walls, roof, electrodes, cooling water, and escaping gases. (A bibliography of the literature on the subject is given in the report.)

Messrs. Wolfe and Wysocki in "Heat Losses Through Electrodes of a 6-ton Heroult Furnace" give data for heat losses through the cooling water, but obviously tests of this kind are not complete, since a large amount of heat is lost at the electrodes which is not carried away by cooling water. The figure of 18.7 per cent given for power loss of the electrodes did not represent the complete loss at this point. This is especially true in those furnaces where there is considerable clearance between the roof and the electrodes, which permits the escape of gases in large volume, carrying a tremendous amount of heat with them. The economizer referred to in our last report will prevent the escape of a large amount of heat, and lengthen the life of the electrodes as well.

In the Stobie furnace, which was developed in England and used quite extensively there, the makers claim a device which greatly reduces the heat losses at the opening between roof and electrodes. This device consists of a series of telescoping tubes placed around the electrodes above the roof, and quite effectively seals the opening against escaping gases and heat. The maintenance of tight joints between adjacent sections is a matter which should be investigated.

A considerable amount of heat loss occurs through furnace doors, which should be designed to give as effectual a seal as possible.

Electrode Specifications

An initial specification on any material generally cannot be complete, and the committee has realized that its first attempt to draw up an electrode specification, such as the one presented at our last convention, would be far from satisfactory.

It was hoped, after a year's use of the suggested specification, to send out another questionnaire to manufacturers, and record the results of such use in this paper. The industrial depression has caused the shutting down of most electric furnaces, and operating data under the new electrode specifications are therefore not available. It is hoped the specifications will be criticized and eventually corrected and elaborated.

In the committee report before the last convention reference was made to "a well defined belief that the high rate of melting, obtained by high voltages, is detrimental to the quality of the product, especially to tool steel." A considerable amount of discussion by correspondence has taken place as to the relative merits of dual voltages, the matter dividing itself into three features: Effect of relatively high voltage during melting, on the quality of steel. Effect of relatively high voltage during melting, on the refractories within the furnace. Effect of relatively low voltage during refining, on the refractories within the furnace.

High Voltages During Melting

There seems to be a general opinion that equal results as to metal quality can be secured by either single or dual voltages. Some users feel that there is practically no change in the quality of steel when melted and refined at one voltage anywhere between 100 and 140 volts, such as is used in the Heroult, Greaves-Etchells, Ludlum, and similar types of furnaces. However, there seems to be a decided antipathy for voltages, say 160 to 250, as the extremely long arc with such voltages is detrimental to the metal, particularly high grade tool steels, and also very severe upon the refractories, especially during refining.

On the other hand, while it appears reasonable that detrimental effects to the metal are produced during a high voltage melting period, yet these effects can largely be eliminated by a relatively longer refining period. It is also evident that better steel is made by preventing contamination of the metal, than by allowing contamination and then attempting to eliminate the injurious elements. In other words, we return to the old adage "an ounce of prevention is better than a pound of cure," and whether or not this is worth considering, from the standpoint of commercial steel production, is more or less debatable.

As to just how the steel is affected no one at present, it would seem, can answer, for this brings in such obscure phenomena as the effect of oxygen and nitrogen on molten steel at high temperatures. In a mass of solid steel scrap, having a source of intense heat at its center, with considerable space for gases to play between the fragments of material, we have an ideal condition for the thorough mixing of oxygen and nitrogen with solid, molten, and even vaporized steel.

That such conditions permit of the most active chemical action between the gases and the steel needs no comment. The more intense the action is, the longer must be the period when these gases, oxides, nitrides and other combinations must be eliminated from the final product. This action is present in a greater or less degree in every arc furnace, or open-hearth furnace for that matter, and it might be pointed out now that this may be one of the reasons why the induction furnace is said to produce a higher quality of steel.

Effect of a Long Arc

Assuming, however, that nitrogen is injurious to steel, it would appear that nitrogen fixation would increase when a relatively longer arc with high voltage was used, than with a short arc when lower voltages are used. In other words, the principle of a steel melting furnace with such a long arc is very similar to the Berkelund and Eyde or Schonherr nitrogen fixation furnaces. The fact that the arc is long gives a much greater path of air for the arc to pass through, and it is reasonable to assume as a hypothesis that the greater air gap the arc traverses the greater will be

*Electrical engineer, Halcomb Steel Co., Syracuse, N. Y. The article is the report, substantially complete, submitted by Mr. Moore's committee to the Association of Iron and Steel Electrical Engineers, at the Chicago convention.

the quantity of nitrogen or nitrous oxide produced.

You will readily recall experiments made in the laboratory with an ordinary static machine, and how the length of the arc was varied by increasing the air gap. You also probably noticed that the longer the arc the more perceptible the presence of ozone became, indicating a greater conversion of oxygen to ozone.

While ozone is an allotropic form of oxygen, one and one-half times as dense—a much more powerful oxidizer than oxygen gas, and nitrogen a very inert gas combining only at high temperatures, and then only with a limited number of elements, it would appear consistent to expect similar results with both as expressed in our hypothesis. The fact that nitrogen combines only at high temperatures is a fair indication of its presence in steel, particularly when a long arc is used, as with higher voltages.

As a result of this supposition, it was thought desirable by the committee to investigate thoroughly the phenomena within an arc furnace, by taking photographs of the arcs with a multi-exposure high-speed camera, and simultaneously recording the phenomena of the circuit with an oscillograph. Also a close analysis of the steel, both physical and chemical, was to be made with particular reference to the occurrence of nitrogen in more or less degree, as the value of the melting voltage and consequently the length of the arcs were increased.

Microscopic examination of steel has revealed a fine irregular needle structure, which has generally been accepted to be typical of iron nitride. This structure has been studied by a number of investigators, as outlined in the report. In an article in *THE IRON AGE*, volume 108* on "An Occurrence of Nitrogen in Steel," A. A. Blue presents data showing evidences of direct combination of ordinary inert atmospheric nitrogen with iron at moderate heating temperatures.

Presence of Nitrogen at High Temperature

If evidence of nitrogen is found in iron at moderate heating temperatures (not over 1800 deg. Fahr.), it is reasonable to assume that at temperatures several times these amounts, such as exist in the electric furnace, a much greater combination will result. To our knowledge this type of investigation has never been made, although J. Kelleher, in his paper "Some Phenomena Observed in Electric Furnace Arcs," before the American Electrochemical Society, projected images upon a screen through an aperture in the walls of a small single arc dc experimental furnace, from which sketches of the arc could be made.

These sketches showed that the flame of the arc apparently flowed from the electrode to the slag, depressing the slag and flaring out at all sides when the electrode was the negative pole. An arc length of 3 in. was easily maintained, and under these conditions the arc was silent. With the electrode as the positive pole the arc was very unstable, starting below the surface of the slag, the flame moving away from the slag surface and projecting particles of slag into space with considerable force. The arc could barely be maintained, at a greater length than 1 in., and was loud and spluttering.

These observations were of course made in an experimental furnace using direct current, and may have no bearing in a commercial furnace. However, the obscure information obtained certainly warrants further extended investigation and discussion.

In carrying out this work, it was proposed to use a new type of portable oscillograph to record the wave form, building up of current, instantaneous current and voltage wave distortion, high frequency, harmonics and other phenomena. As a number of phenomena in an electric furnace circuit are over in 0.001 second, the ordinary moving picture camera, capable of from 15 to 35 exposures per second, is hopelessly slow, and it was proposed to use a polar multi-exposure high-speed camera capable of taking pictures at the rate of 3000 per second, thus being comparable to the oscillograph in recording the details of transient electrical phenomena.

For some purposes, of course, such speed is not

necessary, but for many of the extremely rapid changes in the configuration of visible forms the finely defined, well distinguished, high-speed pictures are necessary if data of any value and utilization are to be secured. The stereoscopic exposures obtainable, when properly mounted, give, with unusual vividness, a view of what is occurring in the arc, as the flame or object appears to stand out in space, disclosing the shape in three dimensions.

The oscillograph and high-speed camera are synchronized so that, by pressure of a single button, the mechanism of both is operated so as to give simultaneous records.

Effect on the Refractories

Irrespective of the merits or demerits of high voltage during melting on the quality of steel, the effect upon the refractories within the furnace is about the same in each case, for the reason that the charge is cold, and most of the heat generated goes into the cold metal. Also, at this stage of operation, there is no blanket of slag to reflect the heat of the arcs in such manner as to cause damage to the refractories.

Unquestionably the use of a relatively lower voltage for refining is desirable, since the amount of power input can be much reduced. With a lower voltage and reduced power input a much shorter arc can be maintained, and this alone will give a prolonged life to the refractories of the roof, and to the walls as well. With a single voltage available, this must be high enough—usually around 100 volts—to give suitable power input to the furnace for reasonably rapid melting, and yet for refining purposes this is too high, because excessive heat radiation from the longer arcs will greatly curtail the life of the roof.

On the other hand, a voltage of 100 for melting, while entirely satisfactory, can reasonably be increased to at least 120 volts without injuring the refractories a bit more than with 100 volts, and in addition more rapid melting is secured, better regulation from the regulators, and the kwh. per ton input reduced. In some instances, a value of even 140 volts would be advantageous, although above this point joint trouble is liable to develop in the electrodes. The values given above are based on 3-phase 6-ton Heroult furnaces.

For refining, a voltage low enough to give sufficient power input into the furnace to maintain heat balance is desirable, and yet not low enough to allow the electrodes to dip into the bath, or the metal and slag to be splashed against the electrodes, by the action of the arcs, as contamination of the metal will result. A value of 60 volts on a 3-phase 6-ton Heroult furnace installation, with 1500 kva. connected capacity, was found ideal from a power input, refractory, and electrical efficiency standpoint, but undesirable because the electrodes would occasionally drop momentarily into the bath, and thus increase the carbon content of the steel. A voltage of 65 was likewise found undesirable.

At 70 volts, however, the arc length is greater, and the vertical distance from electrodes to bath level sufficient to give nearly as good electrical and refractory performance as at 60 volts, but with much greater safety from contamination due to dipping electrodes. Values of 75 and 80 volts are also desirable, but with a slightly decreasing electrical efficiency and refractory life, but greater safety from contamination. Individual installations will require separate consideration, with the selection of a value between 70 and 80 volts, which will best meet the specific case.

General Conclusions

To recapitulate, it would appear that as good steel could be made using dual voltage as with one voltage, provided the melting voltage is not too high; and, in addition, better economy may be secured electrically and from refractories. This economy amounts to quite an amount, so that the use of dual voltages is well justified and, we believe, will pay handsome dividends.

On Jan. 1, 1921, the total number of electric steel furnaces in this country was 356, and we believe this number has not been increased during the first six months of this year. There has been very little activity in the non-ferrous industry, although there has been a small increase in the number of brass furnaces.

*July 7, 1921, page 1.

Three Types of Alloy Sheet Steel—III

Electric and Acetylene Welding Details and Their Effect on Physical Properties —Chrome-Vanadium Steel Adopted

—BY HORACE C. KNERR*

ELECTRIC spot welds, although not used to transmit heavy stresses, play an important part in the manufacture of sheet steel fittings, often being used to hold parts in place for brazing and, in some cases, to replace rivets. Tests were therefore made to determine the comparative value of the three alloys in spot welding.

Specimens of $\frac{1}{8}$ -in. sheet were sheared into strips about $\frac{1}{2}$ in. wide and 4 in. long. A pair of strips was overlapped about $\frac{1}{2}$ in. and a single spot weld applied to join them as in Fig. 1. One set of 5 specimens of each alloy was welded as received and another set was pickled before welding, to remove scale.

Electric Spot Welds

After spot welding, the specimens were heat treated identically with the corresponding tensile specimens and then tested in tension, the breaking load in pounds being determined. The results are given in Table 6. Tests of spot welded specimens show that:

All three steels spot welded satisfactorily.

Removal of scale by pickling greatly improved the strength and uniformity of joints in each case, and the welds were made much more rapidly.

When pickled, the greatest average breaking strength was obtained from the 3.50 per cent nickel steel. Unpickled, chromium-vanadium steel gave best results. The unpickled 3.50 per cent nickel steel showed the greatest variation in strength.

All but two specimens, marked "X," Table No. 6, failed by shearing through the spot weld. These two failed by breaking the specimen in tension, tangent to the spot, and were the two highest in tensile strength.

The spot welds varied from $\frac{3}{16}$ to $\frac{3}{8}$ in. in diameter.

The nickel-chromium specimens showed a tendency to porosity in the weld.

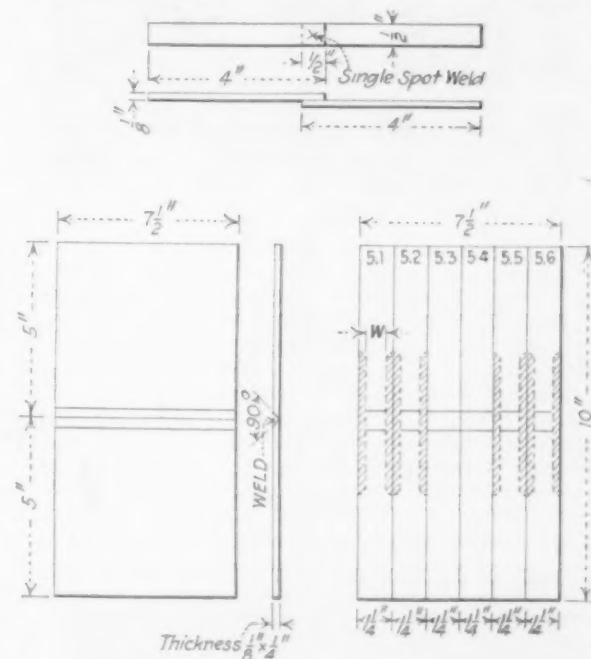
Acetylene Welding

Two sheets, $7\frac{1}{2}$ in. wide by 10 in. long, were taken from each grade and thickness of steel. These sheets were cut in half and the cut edges milled to a 45 deg. bevel, so as to give a 90 deg. V when joined (Fig. 2),

*Metallurgist Naval Aircraft Factory, Philadelphia. The first and second installments appeared in THE IRON AGE, Sept. 8 and 15.

the joint being a continuous weld $7\frac{1}{2}$ in. in length.

One set of sheets was welded with copper-plated Norway iron welding rod. The other set was welded with the parent metal, strips about $\frac{1}{16}$ to $\frac{1}{8}$ in. wide being sheared from the $\frac{1}{8}$ -in. sheet of each grade for



Figs. 1 and 2 (Upper and Left) Show Method of Welding Used. Fig. 3 (Right Lower) Size and Appearance of Tensile and Bend Specimens Cast from Original Sheets

welding rod. No flux was used in either case. The specimens were supported so as to allow free expansion during welding. The sheets were laid on firebrick and preheated with the oxyacetylene torch to a dull red heat for about one inch back from the joint. The ends of the joint were first "tacked." The $\frac{1}{8}$ -in. sheets were welded in one run; the $\frac{1}{4}$ -in. specimens

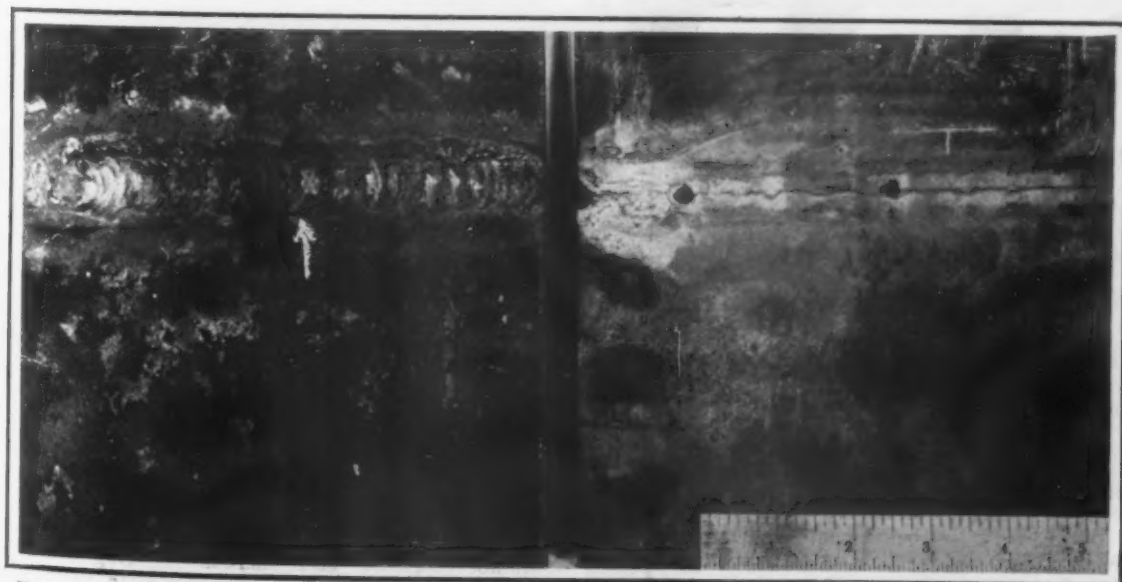


Fig. 4—A Front and Back View of the Welded Sheets. This particular one is the bead side of welded sheet No. 12, nickel-chromium, $\frac{1}{8}$ -in. thick, parent metal melt bar, which developed a shrinkage crack (arrow)

required a second run to fill the joint. The weld was little, if any, thicker than the sheet. All sheets warped slightly in welding. For uniformity, all the work was done by one welder, the most skillful operator in the shop. Fig. 4, shows the "bead" side of welded sheet No. 12, nickel-chromium, $\frac{1}{4}$ -in. thick, parent metal melt bar, which developed a shrinkage crack (arrow). The corresponding $\frac{1}{4}$ -in. sheet (No. 10) also developed

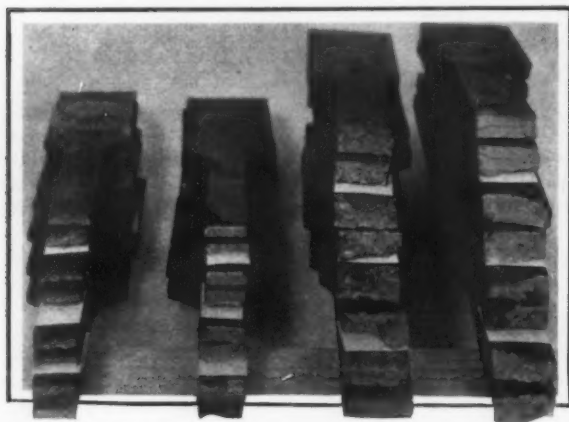


Fig. 5—Welded Tensile Specimens After Rupture, Chrome-Vanadium Steel Sheet

small cracks in the weld. The reverse side of sheet No. 15, 3.50 per cent nickel, $\frac{1}{4}$ in. is shown. No cracks were found in any of the nickel or chromium-vanadium welds.

After welding, the sheets were cut into tensile and bend specimens as shown in Fig. 3. These specimens were heat treated identically with the corresponding standard tensile specimens before testing. The joint was not "dressed" or ground off, but was tested in the condition as welded.

Average maximum and minimum tensile values for

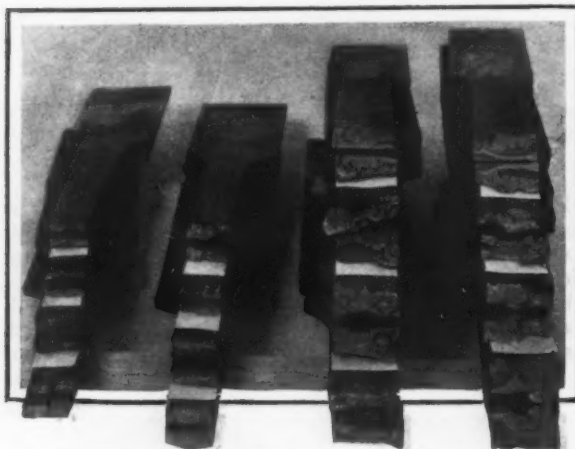


Fig. 6—Welded Tensile Specimens After Rupture, Nickel-Chromium Steel Sheet

$\frac{1}{4}$ and $\frac{1}{4}$ -in. specimens of each type appear in Table No. 7. A comparison of the results obtained in the three steels, using parent metal and Norway iron melt bars is given in Table No. 8, with a final comparison of parent metal vs. Norway iron for all steels, in Table No. 9. Photographs of welded tensile specimens after rupture are given in Figs. 5, 6 and 7. The following points are noteworthy:

All three steels can be welded either with Norway iron or with parent metal welding rod. Although the latter gives a higher maximum tensile strength, the minimum strength may be as low or lower than the minimum obtained with Norway iron rod. The latter is easier to manipulate, shows less tendency to burn and to develop shrinkage cracks, and is therefore preferable.

When welded with Norway iron, chromium-vanadium steel and nickel-chromium steel gave about the same tensile strength, per cent elongation and variation from minimum to maximum of these properties, chromium-vanadium being slightly superior. Nickel steel 3.50 per cent gave slightly higher average tensile strength and lower elongation with greater uniformity (less variation).

When welded with parent metal the 3.50 per cent nickel steel is distinctly the best in all respects, having a higher tensile strength, greater ductility and greater uniformity of these qualities than the other alloys. The nickel-chromium steel is next in order and the chromium-vanadium lowest.

The welder found the nickel-chromium welding strip somewhat more difficult to manipulate than the others, as it had a tendency to become spongy and "burn."

The difference in strength of welds made with Norway iron and parent metal is much less than the difference between the physical properties of these materials, heat treatment being understood in both cases. See Tables Nos. 8 and 9.

It is noteworthy that the minimum strength values for parent metal welds were less than those for Norway iron welds in the chromium-vanadium and nickel-chromium steels. This was no doubt due to the better quality of welds made with the Norway iron and indicates that the latter is the more reliable medium, at least under the conditions of the present test.

Bend Tests

A few bend tests on welded (heat treated) joints were made. Results are given in Table No. 10. The welds were not dressed, but tested in their natural condition as with the welded tensile specimens.

Note: The operator who performed these bend

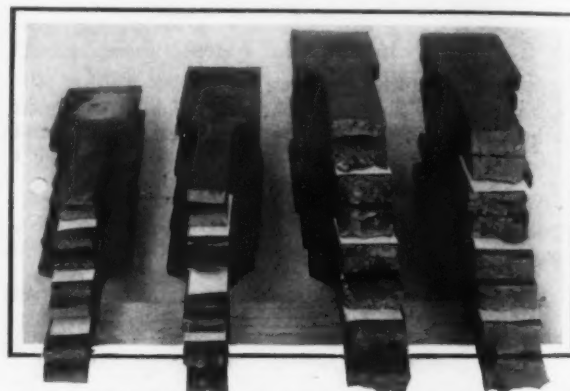


Fig. 7—Welded Tensile Specimen After Rupture, 3.50 Per Cent Nickel Steel

tests recorded which was the convex (tension) side in bending, but failed to arrange this variable in a systematic manner, placing the "bead" or built-up side sometimes up and sometimes down, so that the results are not always strictly comparable.

The 3.50 per cent nickel steel specimens showed distinctly the best bending qualities, with the chromium-vanadium second and the nickel-chromium last, which corresponds to the order of merit in the welded tensile specimens.

The angle of bend withstood by the parent metal

Table No. 6—Electric Spot Welds, Tested in Tension
(Values Give Breaking Load in Pounds)

Spec. No.	Chromium-Vanadium		Nickel-Chromium		3.50 Per Cent Nickel	
	Pickled	Not Pickled	Pickled	Not Pickled	Pickled	Not Pickled
1	4,650	2,745	3,940	2,055	3,585	1,935
2	3,755	2,080	3,740	2,465	4,750	2,890
3	3,715	4,855x	3,160	2,510	4,385	2,980
4	4,770	2,445	3,130	2,490	5,675x	3,235
5	4,105	3,860	2,280	2,095	3,560	1,060
Aver.	4,199	3,197	3,250	2,321	4,391	2,418

Heat Treatment: Spot welded specimens were given the same heat treatment as tensile specimens, aimed to give 150,000 lb. pr sq. in. in the steel. (See Table 3.) Results checked by Brinell hardness readings.

Remarks: Superiority of the specimens of all types from which scale has been removed by pickling is noteworthy.

The chromium-vanadium steel gives the most satisfactory results, considering strength and uniformity.

Specimens marked "x" broke in tension, tangent to spot weld. All others failed by shearing through the weld.

welds was practically the same as that of the Norway iron welds for each given alloy and thickness.

The results obtained from these few tensile and bend tests show great irregularity, due chiefly to sponginess and defective contact in the weld, but it is believed that a careful welder could obtain more consistent results with practice. Too much dependence should not be placed on welded joints in any case, how-

Table No. 7—Oxy-Acetylene Welds, Tension Tests
Chromium-Vanadium Steel

Sheet No.	Melt Bar	Thick, In.	Ultimate, Lb. Per Sq. In.		Elong., Per Cent in 2 In.		Elong., Per Cent in 4 In.		Rating Per Cent of 150,000 Average
			Ave.	Min.-Max.	Ave.	Min.-Max.	Ave.	Min.-Max.	
5	Norway	1/8	83,200	75,400	2.6	1.0	1.3	1.0	55.5
				94,700		3.5		1.7	
6	Parent	1/8	47,700	25,800	0.5	0.0	0.2	0.0	31.7
				85,500		1.5		0.7	
7	Norway	1/4	59,000	49,000	6.0	4.0	3.0	2.0	39.2
				66,300		7.0		3.5	
8	Parent	1/4	101,300	90,300	3.2	1.0	1.9	1.0	67.4
				115,200		7.0		3.5	
<i>Nickel-Chromium Steel</i>									
9	Norway	1/8	74,400	50,200	2.0	2.0	1.0	1.0	49.5
				90,500		2.0		1.0	
10	Parent	1/8	83,500	40,700	0.2	0.0	0.1	0.0	55.6
				129,600		1.0		0.5	
11	Norway	1/4	58,800	46,100	6.3	6.0	3.5	3.0	39.2
				68,500		7.0		4.0	
12	Parent	1/4	102,200	66,100	2.5	2.0	1.2	1.0	68.0
				135,500		3.0		1.6	
<i>Nickel Steel, 3.50 Per Cent</i>									
13	Norway	1/8	87,250	80,100	2.5	2.0	1.2	1.0	58.1
				97,100		3.0		1.5	
14	Parent	1/8	132,200	120,400	2.5	2.5	1.2	1.2	88.2
				136,800		2.5		1.2	
15	Norway	1/4	69,050	50,800	4.6	3.5	2.3	1.7	46.0
				95,800		6.0		3.0	
16	Parent	1/4	105,050	72,700	3.8	3.0	1.3	1.5	69.7
				137,400		4.5		2.2	

Note.—All breaks occurred at weld. Each average value represents four tests.

ever, and they should not be required to transmit high stresses. A breaking strength of 25,000 lb. per sq. in. would seem to be a safe allowance for welded joints, heat treated. In special cases, this might be increased to 40,000 lb. per sq. in.

Since starting this investigation a considerable amount of chromium-vanadium steel of similar composition has been welded in the shop in the manufacture of fittings, with satisfactory results, Norway iron welding wire being used. No high stresses are transmitted through welds.

Brazing and Machining

Any of the steels may be brazed by the ordinary methods. The heat of brazing would, of course, remove the effects of previous heat treatment, and the latter must therefore follow brazing. Brazing material of 80 per cent copper, 20 per cent zinc composition has a melting point between 1650 and 1750 deg. Fahr., and will withstand the temperature of heat treatment of even chromium-vanadium steel. Although in the latter case, the margin of safety is rather small, satisfactory results have been obtained for a considerable time in production with brazed chromium-vanadium fittings which require quenching at 1625 deg. Fahr. Heat treatment tends to strengthen the brazed joint. Parts are often held together by electric spot welding before being brazed. This also prevents letting go in case the brazing material softens in heat treatment. Brazed joints develop a tensile strength of about 40,000

lb. per sq. in. and are remarkably uniform. There is less tendency to damage the steel by overheating in brazing than in welding.

All the steels were found more difficult to machine than low carbon steel sheet, but could be sheared, milled, drilled, etc., with ordinary tools in the annealed state with reasonable facility. Tests made at another time on steels of similar analysis, heat treated for 125,000 to 150,000 lb. per sq. in. showed that they could be drilled and machined on milling cutter or lathe with ordinary drills or high-speed cutters, although with some difficulty.

Impact and fatigue tests, at least of a comparative nature, on these three steels would be interesting and valuable, but lack of time has prevented including them in this investigation.

Chromium-Vanadium Steel Adopted

As the other two types of steel failed to meet the bend test and would therefore not be suitable for the fabrication of fittings of the type intended, and as chromium-vanadium steel showed excellent qualities in bending, and was also satisfactory under all the other tests applied, this steel was adopted. As stated elsewhere in this report, chromium-vanadium steel has now been used in the fabrication of aircraft fittings for about one year. Gages run from 0.035 in. to 1/4 in. This material is hot rolled, and is furnished in sheets most of which are 18 in. by 72 in., straight rolled. The manufacturer believed that a carbon content of 0.30

Table No. 8—Comparison of Alloys
Welded with Norway Iron and Parent Metal
(Average of 1/8 and 1/4-in. Specimens, Each Alloy)
(Data from Table 7)
Chromium-Vanadium Steel

Sheet No.	Melt Bar	Ultimate, Lb. Per Sq. In.		Elong., Per Cent in 2 In.		Elong., Per Cent in 4 In.		Rating Per Cent of 150,000
		Ave.	Min.-Max.	Ave.	Min.-Max.	Ave.	Min.-Max.	
5 & 7	Norway	71,100	49,000	4.3	2.0	2.1	1.0	47.3
			94,700		7.0		3.5	
6 & 8	Parent	74,500	25,800	1.8	0.0	1.0	0.0	49.5
			115,200		7.0		3.5	
<i>Nickel-Chromium Steel</i>								
9 & 11	Norway	66,600	46,100	4.1	2.0	2.2	1.0	44.3
			90,500		7.0		4.0	
10 & 12	Parent	94,880	40,700	1.3	0.0	0.6	0.0	61.8
			135,500		3.0		1.5	
<i>Nickel Steel, 3.50 Per Cent</i>								
13 & 15	Norway	78,150	50,800	3.5	2.0	1.7	1.0	52.0
			97,100		6.0		3.0	
14 & 16	Parent	118,620	72,700	3.1	2.5	1.2	1.2	78.9
			127,400		4.5		2.2	

All specimens heat treated for 150,000 lb. per sq. in., as in Table No. 3.

Specimens not dressed, weld in "natural" condition.

Breaking stress figured from area of gage length adjacent to weld, therefore, represents stress in sheet at maximum load. Approximate maximum thickness of weld given for comparison, exceeds thickness of sheets 20 to 50 per cent. Widths identical. All breaks occurred in the weld.

Practically all elongation was confined to the welds, failure having occurred below the elastic limit of the steel.

to 0.40 per cent would more easily meet the specification than the 0.25 per cent to 0.35 per cent originally called for, and at his request the higher content was allowed. This analysis (No. 6135) also met the bend test and physical tests and had the advantage of a lower critical range, which widened the margin of safety in heat treatment after brazing. It has proved satisfactory in manufacture and in service except for

to develop 150,000 lb. per sq. in. These withstood a transverse bend, but failed when bent longitudinally.

Molybdenum Steel Suggested

It has been suggested that chrome-molybdenum steel might have superior qualities for the manufacture of high strength sheet steel fittings. Samples of this steel of about 1.00 per cent chromium, 0.35 per cent

Table No. 9—Norway Iron Versus Parent Metal Weld Average—All Alloys

Melt Bar	Specs. Tested	Ultimate, Lb. Aver.	Per Sq. In. Min.-Max.	Elong., Per Cent in 2 In.		Elong., Per Cent in 4 In.		Rating Per Cent of 150,000
				Ave.	Min.-Max.	Ave.	Min.	
Norway iron	24	71,950	46,100	4.0	2.0	2.1	1.0	47.9
Parent metal	24	95,300	97,100	2.1	7.0	0.2	4.0	63.4
			137,400		7.0		3.5	

a few sheets which failed to harden properly in heat treatment. These were found upon examination to have a non-uniform carbon content which ran as low as 0.20 per cent and showed "ghost line" structure under the microscope. These sheets may have come from a single defective ingot, or they may have been decarburized in rolling heats or annealing.

It is understood from the manufacturer that of the three alloys discussed, the chromium-vanadium steel presents the least difficulties in manufacture, especially with regard to facility of rolling, freedom from scale and tendency to segregation in the ingot.

Prior to the adoption of chromium-vanadium steel a quantity of 3.50 per cent nickel steel and also of plain carbon-vanadium steel, both of 0.30 to 0.40 per cent carbon were tried for the fabrication of fittings. Each of these showed a tendency to split longitudinally when bent, and were therefore unsatisfactory for any but flat work, or where the bend could be made transversely to the length of the sheet or "grain." Neither cross rolling nor special annealing eliminated this tendency to split. The same difficulty has been found with plain low carbon sheet steel, cold rolled and annealed.

In another test, the two longitudinal and two transverse bend specimens, each of $\frac{1}{4}$ and $\frac{1}{8}$ -in. sheet, from this lot of chromium-vanadium steel, were heat treated to give about 175,000 lb. per sq. in. (Brinell hardness 340 to 375) and were bent through 180 deg. over a radius equal to three times their thickness. The four $\frac{1}{4}$ -in. specimens showed no cracks, but one of the four $\frac{1}{8}$ -in. specimens failed on a longitudinal bend.

Similar bend tests were made on sheets of chromium-vanadium steel of 0.35 per cent carbon content, from a different manufacturer, and heat treated

molybdenum and 0.30 per cent carbon have been obtained from the same manufacturer and will be given tests similar to those outlined above.

Ericsson and DeLamater to Be Honored

On the sixtieth anniversary of the battle of the Monitor and the Merrimac at Hampton Roads, Va., tribute will be paid in fitting ceremonies to the memories of Cornelius H. DeLamater and Capt. John Ericsson, pioneers in the development of the naval, marine and industrial interests of the nation, particularly during the Civil War. Bronze tablets will be erected on four sites of buildings in New York, with which these men were identified. The first is the Phoenix Foundry, 260 West Street, where the first iron boats in this country were built; the second, the DeLamater Iron Works, foot of West Thirteenth Street, where were built the first self-propelled torpedo, the first submarine boat and the engines for the original Monitor; third, the Continental Iron Works, Greenpoint, Brooklyn, where the hull of the Monitor was built; fourth, No. 36 Beach Street, where Captain Ericsson lived, worked and died.

The tablets will be unveiled on March 9, 1922, a dinner being held that evening. About 20 societies are behind the movement. The Government has appropriated \$35,000, private individuals have subscribed a larger sum for a memorial to Captain Ericsson in Washington, and \$5,000 is being raised for the tablets to be placed in New York. Affairs are in charge of the DeLamater-Ericsson Tablet Committee, 29 West Thirty-ninth Street, New York.

Table No. 10—Welded Specimens—Bend Test

(Specimens Heat Treated, Same as Tensile Specimens, Table No. 7)

(Specimens Not Dressed)
Chromium-Vanadium Steel

Thickness	$\frac{1}{8}$ In.				$\frac{1}{4}$ In.			
	Norway Iron		Parent Metal		Norway Iron		Parent Metal	
Melt bar	5.3	5.4	6.3	6.4	7.3	7.4	8.3	8.4
Specm. marks	Flat	Flat	Bead	Bead	Bead	Flat	Bead	Bead
Convex side	26.5	12	26	19.5	2.5	13.5	17	25
Angle to break	Good	Fair	Good	Good	Fair	Seam (Flat)	Pits (Flat)	Fair

Nickel-Chromium Steel

Thickness	$\frac{1}{8}$ In.				$\frac{1}{4}$ In.			
	Norway Iron		Parent Metal		Norway Iron		Parent Metal	
Melt bar	9.3	9.4	10.3	10.4	11.3	11.4	12.3	12.4
Specm. marks	Flat	Bead	Flat	Flat	Flat	Flat	Flat	Bead
Convex side	19	30	15	32.5	8.5	6.5	12.5	6.5
Angle to break	Seam (Flat)	Fair	Seam (Flat)	Crack (Bead)	Fair	Seam (Flat)	Crack (Bead)	Cracks

Nickel Steel, 3.50 Per Cent

Thickness	$\frac{1}{8}$ In.				$\frac{1}{4}$ In.			
	Norway Iron		Parent Metal		Norway Iron		Parent Metal	
Melt bar	13.3	13.4	14.3	14.4	15.3	15.4	16.3	16.4
Specm. marks	Bead	Flat	Flat	Bead	Bead	Flat	Bead	Bead
Convex side	51	31.5	28	51	18	21	21.5	18.5
Angle to break	Seam (Flat)	Fair	Good	Good	Fair	Good	Seam (Flat)	Good

NOTE.—Bends made in V-block, under compression head.

"Condition of Weld"—determined by inspection of visible flaws before bending.

"Seam"—indicates defective contact in weld.

"Pits"—indicate blowholes or sponginess.

"Cracks"—indicate cracks in weld, as by local contraction.

"Angle to break"—indicates amount of bending in degrees, from flat, to produce distinct cracking.

New Line of Horizontal Boring, Drilling and Milling Machines

The Pawling & Harnischfeger Co., Milwaukee, has developed a new line of horizontal boring, drilling and milling machines, of which the 4-F machine shown in the accompanying illustration is the smallest size. It is designed for very heavy milling and large boring operations.

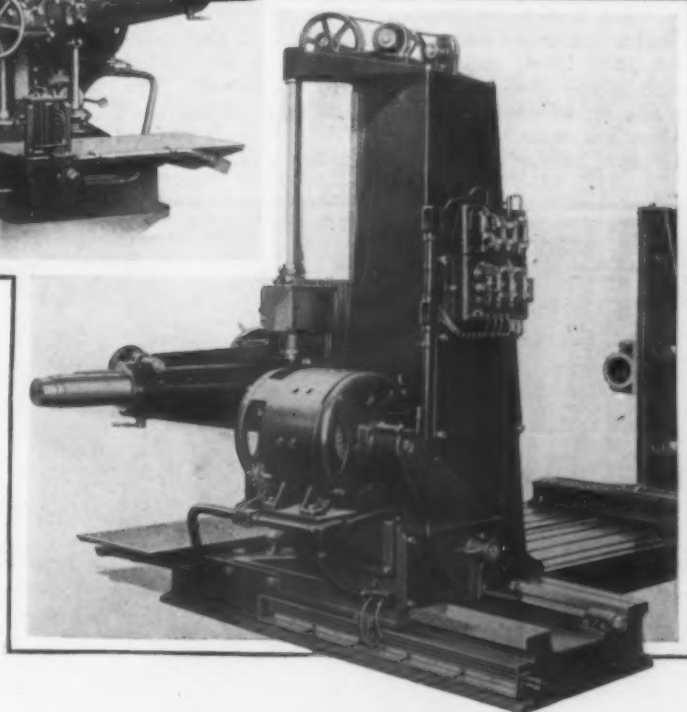
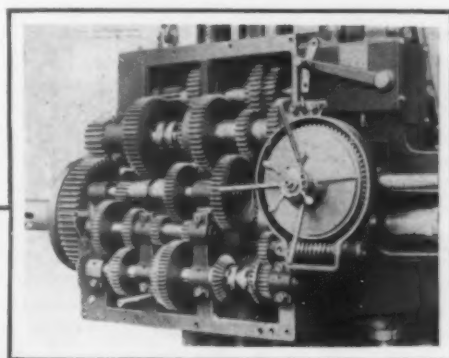
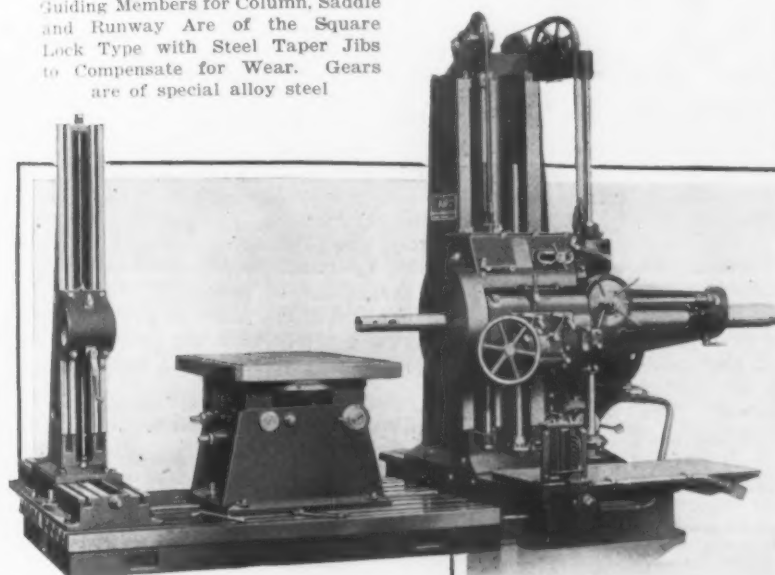
Among the features may be mentioned narrow guiding surfaces; feed screws in tension; sliding parts with take-up for wear; saddle counterbalanced with counterweight inside the column; and centralized control. Milling feeds are actuated through quick pitch worm and bronze worm wheels, revolving on quick pitch screws in tension. Externally- and internally-driven face plates are interchangeable. Back gears are close to the spindle, making all drive shafts high

The machine is driven by motor, constant or variable speed, or by belt. The motor required is 10 hp. and is mounted at the base as shown in the illustration. The machine is double back geared and by three levers 18 spindle speeds, reversible, are obtained. The spindle speeds are in geometrical progression and range from $5\frac{1}{2}$ to 200 r.p.m.

The boring and drilling feeds to spindle are 8 in. number, reversible, and range from 0.0076 to 0.45 in. per revolution of the spindle. There are 8 milling feeds to the column and saddle, which are reversible and range from 0.009 to 0.54 in. These feeds are direct from the spindle, back geared and in geometrical progression with no idle gears in mesh. Feed gears and shafts are of alloy steel. Rapid power traverse independent of feeds is transmitted to the saddle and column at a constant speed of 60 in. per min.

Operating controls are within easy reach from the

Guiding Members for Column, Saddle and Runway Are of the Square Lock Type with Steel Taper Jibs to Compensate for Wear. Gears are of special alloy steel



speed, and automatic stops are provided for the saddle and column for machines electrically driven.

The spindle-carrying saddle contains the drive for the spindle, the feeding mechanism and the feed distributing mechanism. Drive gearing and shaft bearings are bronze bushed, the main spindle sleeve bushing being of phosphor bronze, scraped to a slight taper for taking up wear of spindle driving sleeve. The saddle is guided on the column by a narrow guide placed at the front nearest the cutting pressure. Adjustment for wear is made by two steel taper gibs. The saddle is raised or lowered on the column by a revolving bronze worm-wheel nut actuated by a quick pitch steel screw, either by hand wheel, power feed or quick traverse.

The column is of box construction with two sides straight and two tapering to a long, wide base cast integral with it. The screw for feeding is in tension and is placed near the guide. The column can be traversed in either direction by hand wheel, power feed or rapid traverse from the saddle. The runway for the column is wide and heavy. All guiding members for the column, saddle and runway are of the square lock type with steel taper gibs for compensating wear.

The spindle is an alloy steel forging ground to a sliding fit in its driving sleeve. Power is applied at the front end and the feed at the rear through a rack and pinion, the drive being through a small face plate with a coarse pitch gear or a larger face plate with internal gear. These face plates have slots and tapped holes for the attachment of milling cutters and facing heads. The spindle-driving sleeve is of semi-steel, ground to a taper fit and is provided with adjustable bronze taper shoes for taking up wear.

platform attached to the column. Levers are interlocking, it being impossible to have any two conflicting speeds or feeds in action at the same time. The outer support is regularly made with 48 in. vertical and 48 in. horizontal traverse. Graduated steel scales for the main column and saddle, and for the outer support saddle and column are furnished reading to $1/1000$ in. by use of the Verniers.

Screw chasing attachments can be furnished for from 2 to 16 threads per in. and for any length within the capacity of the machine. Universal tilting and revolving table or a plain revolving table, with movement by hand or power, can be furnished.

The general specifications include: Diameter of spindle, 4 in.; taper hole in spindle, No. 6 Morse; feed of spindle, 36 in., and vertical travel of spindle saddle, 48 in. The horizontal travel of the column is 48 in. The height of the spindle from 9-in. bed plate ranges from $73\frac{1}{2}$ in. maximum to $25\frac{1}{2}$ in. minimum.

Special Features of Blast Furnace Plant

Gas Burners Under Boilers Supplemented by Auxiliary Coal—Single Venturi Blast Regulating Device—Complete Water System Includes Many Safety Provisions

AMONG the auxiliary features of the new blast furnace plant of the Trumbull-Cliffs Furnace Co., Warren, Ohio, described at page 673 of THE IRON AGE last week, the methods of firing the boilers, of regulating the blast and of handling the water are of outstanding importance. The following paragraphs cover briefly these items.

Method of Firing the Boilers

There is provided 4000 hp. in five units of 800-hp. class "M" Stirling four-pass boilers, built for 231-lb. pressure and 125 deg. superheat. All boilers are gas fired, each being equipped with four improved 14-in. Birkholz-Terbeck burners, placed at the rear of the boiler under the mud drum. The mud drum is set at an elevation of 10 ft., to provide a large distinct gas combustion chamber. The burners are arranged for removal of cone for cleaning.

Control of gas at the burners is by means of butterfly valves on the individual legs to each burner, and gas is shut off by one large gate valve in the main leading from the large boiler house gas main. In addition, this main can be filled with water to form a water seal valve, thus safely isolating any particular boiler when it is to be entered for cleaning or repairs. The boiler house gas main itself is outside of the building at yard level; dust removed from it is washed through a concrete trench direct to the sewer. The main has an auxiliary bleeder at its end, as has also the stove gas main.

All five boilers have provision for auxiliary coal

firing, being equipped with Marion shaking grates. Coal is brought into the boiler house by means of a track hopper which discharges onto a Jeffrey belt conveyor. This conveyor was used in the construction work for handling brick, and has been re-installed at the boiler house to eliminate the large amount of hand labor usually employed in unloading coal. This Jeffrey belt in turn discharges to a Weller Manufacturing Co. shuttle conveyor which runs along inside of the boiler house, by means of which coal can be discharged to any point along the boiler house floor.

There are ash hoppers attached to the ash pits of each boiler. These hoppers are provided with gates at such elevation in the boiler house basement that a large truck can run beneath, on a concrete runway from yard elevation down into the basement floor of the boiler house. Ashes will thus be dumped direct from these hoppers into an auto truck, and used for fill on the property.

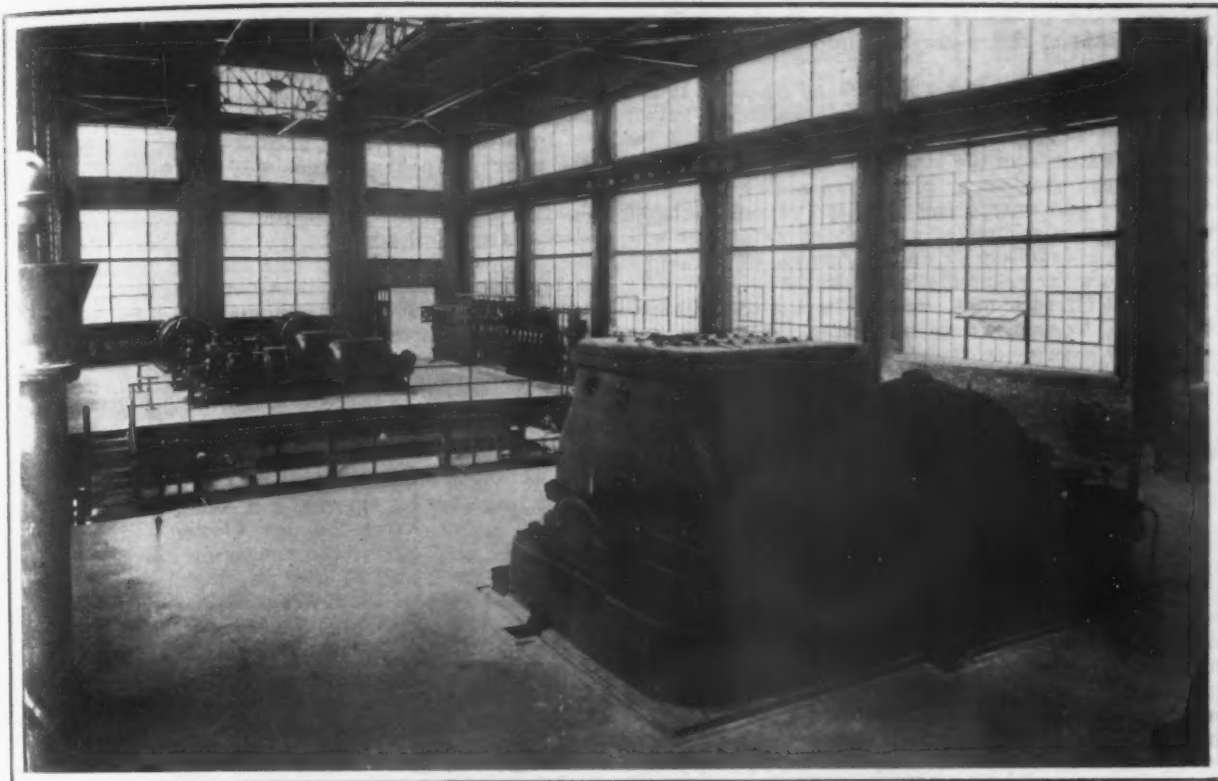
The boilers are substantially built, with particular reference to resisting gas explosions, and the fronts are so constructed that, by addition of a Dutch oven, any standard type of stoker can be placed in them, in the event either of expansion of the plant or desire to generate additional electric power with the existing units. The boilers are placed singly, right and left settings, with 6-ft. aisles.

The Blast and Its Regulation

Two Ingersoll-Rand turbo blowers comprise the blowing equipment. The air blower has five stages



Each of the Five 800-Hp. Boilers Has Four 14-In. Gas Burners, Placed at the Rear, Under the Mud Drum



Possibility of Considerable Future Expansion Is the Predominant Characteristic of This View in the Power House. The turbo-blower is in the foreground. Turbo-generator and motor-generator sets appear in the background, with the switch-board against the right wall. The excellent lighting is evident

and the steam turbine seven. These blowers have a nominal capacity of 45,000 cu. ft. of air per min. at 30 lb. pressure, and will blow 55,000 cu. ft. of air per min. at 22 lb. pressure. The turbines are of new Ingersoll-Rand design, having but two steam admission valves, one for normal load and one for overload.

The regulating device is also of an improved type, consisting of a single venturi instead of the old type of triple venturi. The single venturi is not so sensitively affected by leaks in the intake line, nor by dust or dirt in the air. There is a separate air intake for each blower, which is led up to a considerable distance above the power house roof. Recording gages are provided on each intake to record the amount and regularity of blast volume blown.

Safeguards Feature the Water Supply

The water system of the plant deserves particular mention, as considerable economy is effected in the use of water, at the same time retaining the very desirable element of simplicity of circulation, and furthermore obtaining the possibility of using different sources of water at many points, in the event of failure of any particular source.

Considerable space was saved at the river pump house, which is of novel design, consequently eliminating much concrete and excavation work. The suction well for the pump is inside the pump house, water being led from the pool outside into the tunnel through two 72-in. Link-Belt vertical traveling refuse screens. These are fitted with $\frac{3}{8}$ -in. screens and driven by 5-hp. motors.

In the pump house are installed three 12-in. 6000-gal. 115-ft. head Worthington pumps, motor driven. Two of these pumps, operating, deliver water to the turbo blower and to the turbo generator condensers. Tail water from the condensers is led by a weir to a sump running lengthwise of the pump basement. From this sump the three 4500-gal. Worthington service pumps, two operating, draw their supply and pump through a 20-ft. by 120-ft. standpipe located between the power and boiler houses.

This standpipe in turn delivers water to the blast furnace, cast house, hot blast stoves, cinder pit, gas washer, pig casting machine and water purifying plant, together with all other miscellaneous uses. The flexibility of this system lies in the fact that the lines are so arranged that, if desired, the standpipe can be by-

passed altogether, or it can be used simply as a floater on the service line, no water being actually pumped through it.

Safety provisions are adequately taken care of by connecting the line, that leads from the river pumps to the condensers, to the service water line into which the power house service pumps discharge. In the event of these pumps for any reason being out of commission, the river pumps have sufficient head to keep water on the blast furnace bosh, stoves and water seals and to supply water to the feed water treating plant, thus assuring a supply of water that will prevent damage or serious accident. A further safety provision is afforded in having this same by-pass line from the river pumps discharge, if desired, into the sump from which the basement service pumps draw their supply. This may be found useful in case the condensers have to be taken off.

A further safety provision is found in an ingenious method of returning the bosh water. The overflow water from the furnace is all conserved, and led by a separate pipe line back to a cistern at the extreme end of the basement sump. As long as the level of water in this sump is kept up to the mark by the water coming from the condenser tail water pits, then the return water from the furnace overflows into the sewer and back into the river. However, if the amount of water coming through the condensers and thence to the sump should for any reason be deficient, then the return water from the blast furnace runs into the sump, from which the service pumps pull their supply. Under normal conditions of operation there is about a 40 per cent surplus of condenser tail water going into the sump, over and above the amount of water required at the plant exclusive of condensers.

To safeguard still further the plant supply of water, the lines of the standpipe are equipped with check valves, which will prevent the standpipe from emptying in the event of a break in the line. A final safeguard at the furnace is the provision of check valves in the two distinct water supply lines leading to the circle pipe. Between the circle pipe and these check valves is connected a line from the Worthington high-pressure pump. Inasmuch as this is normally continually kept floating on the high pressure line, the furnace bronze can be preserved in the event of failure of lines or service pumps by opening up the line admitting high-

pressure water to the circle pipe, the check valve preventing escape of this water back into the main service water line.

This high-pressure water is similarly piped up to the stove fittings and to the main isolating water seal valve; in an emergency the high-pressure pump can draw its supply of water from the standpipe which, in the event of a very bad accident or breakdown at the pumps or lines, would still remain full of water. It will be seen that the plant is assured of a supply of water that will last almost indefinitely in an emergency, by virtue of the provisions for re-circulation of water.

The boiler feed pumps similarly have a triple source of supply. Normally they take from the feed water heater. In emergency they also draw from the base-

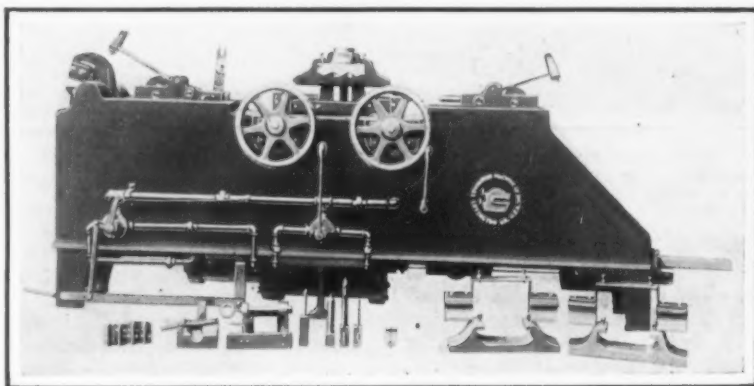
ment sump, from the blast furnace service water lines or from the line leading from the river pumps to the condensers. The turbines similarly draw on two sources for their supply of cooling water, i.e., the service water supply line and the condenser water supply line.

In addition to the Link-Belt traveling screens at the river pump house, the lines are further provided with Elliott twin basket strainers at both of the supply lines to the furnace circle pipe and to the stoves, and also at the line leading to the gas washer. The boiler feed line, the gas washer line and the furnace supply water line are fitted with venturi meters. A tank is provided at the machine shop to which treated water is pumped from the power house basement for the use of the yard locomotives.

Machine for Assembling and Dismantling Hose

A machine for use in railroad shops in the dismantling and assembling of air-brake, signal and steam hose has been developed recently by the Covington Machine Co., Covington, Va. It is claimed that it will do its work without damage to fittings and without straining or cracking of clamps, besides effecting large savings in labor cost over the usual hand method. It is stated that on a test run, one man dismantled 100 air hose in one hour and assembled 25 air hose ready for service in the same length of time.

The entire equipment of tools for the performance of the complete range of work is shown in the illustration. The change from one operation to another is said to be effected in less than 2 min. Air and signal hose are handled by the same tools except the nipple puller which can be put in place in 10 sec. when wanted. Other changes are quickly and easily made. Hose in any condition can be dismantled, even if cut off close up to the fitting. In assembling fittings into new hose injury cannot result as the hose is held rigid without clamping.



The Tools Shown Comprise the Full Equipment for the Complete Range of Work

Drier Air for Blast Furnaces*

Investigations have shown that the moisture content in air at an altitude of 100 ft. above ground level is about 20 per cent lower than at the ground level, both measurements being made in the neighborhood of a blast furnace. This led to an inquiry as to whether such a difference is universal, or due to specific conditions surrounding a blast furnace.

Further investigation has indicated that a difference of moisture content as high as that observed in the present instance was by no means universal, and was probably due chiefly to the fact that air, even at an elevation of 100 ft. above the ground, in the neighborhood of a blast-furnace plant is very much colder than at the lowermost level. This is ascribed to the tremendous amounts of heat delivered to the air from blast-furnace or rolling-mill plants.

In fact, it is stated that, roughly, each 100 sq. ft. of the area of a blast-furnace plant is heated daily by 60 lb. of coke or coal, in addition to which there is a very large amount of water discharged every minute in the various cooling and washing devices. This leads to the conclusion that, to obtain as dry air as possible it is of advantage to take it from a high elevation.

To meet these conditions, the blowing-engine house

at the Rombach mills, when reconstructed, in 1912, was arranged with the suction orifices of all the eight gas-driven blowing engines in a common suction tower 138 ft. high. After the new blower unit was completed, in 1915, fifty-three measurements were carried out, with the result that it was found that air taken through the top of the tower contained, on an average, 12 per cent less moisture than air at the ground level.

In this connection it was found that, when the wind came from the east and north-east, there was a rapid increase in the moisture content in air coming through the suction tower. This is explained by the fact that, at the distance of some 165 ft. from the tower, was a tall stack discharging the exhaust of all the engines driving the blowers. It was evidently the vapor from this exhaust that increased the moisture content in the air.

Would Abolish Railway Labor Board

Iron and steel makers in the Pittsburgh and Youngstown districts are interested in the attitude of John G. Cooper of the Nineteenth Ohio district, who states that he will institute efforts in the forthcoming session of Congress to abolish the Railway Labor Board through amendment of the Esch-Cummins law. Mr. Cooper has been in consultation with a number of independent steel makers in the Mahoning Valley on the subject.

"The Railway Labor Board is not answering the purposes for which it was created and I am convinced that its abolishment will help to bring the railroad managements and their operating forces closer together," he states. "The time has come when the Government should, as far as possible, keep hands off all legitimate business. Many, looking into the future, realize that too much paternalism in Government is a real menace."

Fewer Accidents in Iron Mines

Reports received by the United States Bureau of Mines from operators of iron mines throughout the country show that accidents in the year 1920 resulted in 106 deaths and 9072 non-fatal injuries. The figures represent decreases of 33 fatal and 26 non-fatal accidents as compared with the previous year. The iron mining industry employed 45,990 men, who worked 13,574,788 shifts, which is practically the same as for 1919. Each employee averaged 295 working days, as compared with 292 the year before.

*From a paper by J. Bronn, in *Stahl und Eisen*, June 16.

France Seeks Export Markets for Ore

Autumn Meeting of the Iron and Steel Institute at Paris
—Developments in British Basic Iron Will Reduce Iron
Ore Imports—Sir Hugh Bell on Politics and Trade

(Special Correspondence)

PARIS, FRANCE, Sept. 5.—The autumn meeting of the Iron and Steel Institute, of which the first session opened this morning in the hall of the Comité des Forges de France, will be remembered as notable in many ways. Not only is it the first foreign meeting since that held in Brussels in 1913, but the war which has intervened has changed the whole aspect of the iron and steel industry in Europe, and some indications of the nature of these changes were given in the papers and discussions.

War Questions Uppermost

Another feature which must have struck the thoughtful observer is one which previous meetings have not served to bring to the notice of the average member. This is the extent to which the doings and sayings of great industrialists, such as those at the head of the Iron and Steel Institute and the Comité des Forges de France, affect and are affected by the policies of the nations they represent. The prosperity of all modern civilization depends ultimately on the prosperity of industry, but it is a wise convention that bars political questions from what are intended to be purely technical discussions. Happily, the element of politics did not on this occasion threaten the harmony of the proceedings, although there were times when it was felt that the speakers were skating over very thin ice. Matters such as those which were hinted at and so skillfully avoided are much better discussed privately by those whose knowledge and influence may make discussion fruitful. And when the questions at issue are involved in questions of national policies on which there may be strong divergences in fundamental principles it is perhaps better to postpone discussion altogether until national policies are in better accord. This seems to have been the feeling of the meeting, and the discussions were very diplomatically confined to questions of technical interest.

In the absence through ill health of the president, Dr. J. E. Stead, to whom a telegram was sent conveying the good wishes of the meeting, the chair was taken by Sir Hugh Bell. An address of welcome was delivered by François de Wendel, presi-

dent of the Comité, who urged the visitors to study the political conditions of his country during their short stay, so as to try to understand the French mentality in regard to post-war problems. He referred to the devastation of the French industrial establishments and pointed out that the "reparations," so far as they had been carried out, had all been made with French money. After stating the strong conviction of France as to Germany's longing for revenge, he said that the friendship of England and France was the best guarantee for the peace of the world.

Comment by Sir Hugh Bell

Sir Hugh Bell, acknowledging the address of welcome on behalf of the institute, recalled a conversation with the grandfather of the last speaker in 1869, prophetic of the Franco-Prussian war, and also his long-standing relations with the Schneider family. Referring to the disastrous seven years which have elapsed since the postponed meeting in France of 1914, he said it rested with ourselves to repair the disasters of the whole world. He agreed with M. de Wendel that we should face facts, although he deprecated political contentions and thought divergences of opinion were inevitable. He looked for a change of spirit. There was nothing wanting on the British side to make for France a situation as favorable as possible for reconstruction. His hope was that the eyes of Germany were opened and that her people now believe that of all the bad ways of gaining commerce war is the worst. Sir Hugh dealt very sympathetically with the injuries of France, indicating that the surest means of recovery lay, not in regarding the possibility of further German aggression, but rather in striving to re-establish international commerce on a sound basis.

Sir Hugh Bell then drew attention to the presence at the council table of Prof. Henry le Chatelier, observing that he had met his father in 1859. On behalf of the council and members he congratulated the professor on the fact that he was about to celebrate his jubilee. After acknowledgments from the professor, Sir Hugh presented the Bessemer medal to M. Charles Frémont.

Iron Ore Deposits of Eastern and Western France

THE paper with the above title by Prof. Paul-René Nicou, of Paris, gives an excellent account of France's iron ore resources and contains suggestions of the desirability of developing a strong export trade to Great Britain. The following is a fairly full abstract:

Britain's Need of Foreign Ores

Many changes have taken place in the relative situations of European iron-making countries within the period comprised between 1914 and 1921. One feature, however, remains the same, and that is the need of Great Britain for foreign ores. These ores she has sought in regions widely distributed, and in these regions she must remain vitally interested in order to ascertain whence and under what conditions she can

best obtain the ores required for her blast furnaces.

A fairly considerable import trade in French ores into England had already sprung up before the war, from such ore fields as were adjacent to harbors, such as those of Normandy, Brittany and Anjou, for which Caen and St. Nazaire competed with each other. The ores of Algeria and Tunis, whose purity rendered them specially suitable for the manufacture of high-grade pig iron, were likewise arousing interest, as well as those of Lorraine, among which were the richer of the Briey ores, which had already reached those regions of the United Kingdom more particularly engaged in the manufacture of phosphoric pig iron.

During the war the eastern ore fields of France were unable to be of any assistance to British metal-

lurgy, having been occupied, from the outset, by the German army, and it was not until after the armistice that the enemy evacuated this district. On the other hand the Algerian, Tunisian, Normandy, Anjou and Brittany ore deposits supplied British works, if not with very large quantities, to as great an amount as the exigencies of war permitted. Numerous colliers, laden with the coal necessary to French industry, returned with the ore cargoes of which the United Kingdom was in pressing need.

Now that circumstances have altered and that France, as the result of the recovery of Alsace-Lorraine, has become, of all the continental nations, the possessor of the largest iron ore resources, it is not surprising that British metallurgists should look once again to France as a source of supply, and that the relations which existed before and during the war should display a tendency to become closer and closer, to the great mutual benefit of both nations.

Production of French Iron Ore

To begin with, it may be of interest to compare present day production with the pre-war production, and briefly to sum up the whole situation in regard to the production of iron ore in France. Recourse will be had, for this purpose, to statistics collected by the Department of Mines. The figures for 1920 are provisional only. In 1913, the latest year for which statistics are not affected by the outbreak of the war, the total production of iron ore in France amounted to 21,917,870 tons, distributed as follows:

	Tons
Lorraine (Meurthe-et-Moselle)	19,978,937
Normandy	812,984
Anjou and Brittany	399,926
Pyrenees	370,347
Other districts	355,676

The overwhelming proportion contributed by Lorraine is clearly shown by the foregoing figures. It amounted to 91 per cent. To the total just given, in order to compare the outputs for 1919 and 1920, must be added the output of ore fields of recovered Lorraine, which produced 21,136,265, making a grand total of 43,054,135 tons, produced from districts now wholly French. Of this total the Lorraine deposits produced 95.5 per cent.

Compared with this total, the 1919 and 1920 figures show an enormous falling off. Those for 1919 were only 9,429,789 tons and those for 1920, 13,871,187 tons, and whereas the 1913 production of iron ore from deposits in Lorraine was 41 millions of tons, the 1919 and 1920 figures are only 8,634,526 and 13,072,419 tons respectively. The almost complete destruction of the mines and iron works of Meurthe-et-Moselle, systematically carried out by the Germans, is the chief cause of this falling off. The production of the rich calcareous ores of the Briey field, which in 1913 were mined to the extent of 15,103,849 tons, had fallen in 1919 to 645,245 tons, but recovered considerably in 1920, in which year it reached 3,466,619 tons. The Longwy ore field suffered similarly, and the output fell from 2,958,167 tons in 1913 to 189,853 tons and 714,610 tons respectively in 1919 and 1920. In other words, these two ore fields, whose production in 1913 was 18,062,016 tons, did not produce one million tons in 1919 and barely exceeded four million tons in 1920.

Other French ore fields were similarly affected, although for different reasons. Their production was pushed to a maximum during the war, as they were the only productive ore regions in France outside the German occupation. They therefore enjoyed the advantages of a huge demand, and an influx of enormously increased labor recruited from miners brought from the occupied coal and iron districts, from Moors and Kabyles brought from northern Africa, and from prisoners of war. From the time of the armistice these sources of labor have been almost completely withdrawn.

The metallurgical crisis that took place directly after the armistice owing to the lack of fuel in France similarly served to reduce the orders from home works, and even if some ore fields escaped lightly, others

were seriously affected, as the following figures will show:

Ore Output in Other Regions, 1918-1920

	1918	1919	1920
Normandy	812,984	322,929	357,200
Anjou	399,926	52,211	119,984
Pyrenees	370,347	357,095	213,782
Other localities	355,676	63,028	107,802
Totals	1,938,933	795,263	798,768

Reduced demand for ore for export also helped to reduce production. It should, however, be noted that the proportional decrease in these districts, as compared with that of the whole of France, is 56 to 66. It should also be pointed out that the falling off in production of iron ore was not confined to the Lorraine portion of the eastern deposits. The Luxemburg output in 1913 was 7,333,372 tons, whereas in 1919 it was but 3,112,472 tons, and in 1920, 3,704,390 tons, or, taking the latter year as an example, only 50 per cent of the 1913 production.

Transportation of Lorraine Ores

Although the iron ores of Lorraine, the export of which across channel only commenced in 1912 with 28,014 tons (which rose in 1913 to 69,224 tons), have been a much shorter time on the British market than those of Normandy and Brittany, they are destined, sooner or later, very largely to be laid under contribution by British iron makers. The ores of this field are doubtless less favorably situated, from the point of view of transport, than those of Normandy, Anjou and Brittany, seeing that Homécourt, the northern extremity of the ore field, or, at any rate, of the export area proper, is 400 kilometers by rail from the port of Dunkirk, and that it is not yet feasible to make use of any waterway which might afford cheaper means of transport. The project of a north-eastern canal which should link up the Longwy metallurgical region with the Ardennes and be in communication with existing waterways, thus improving considerably the local conditions, has been discussed over and over again; but the heavy cost which, in existing circumstances, such a project would entail must render its realization a matter of time. Meanwhile the Lorraine ore field will have to rest content with existing means of transport, if cargoes are to be exported from a French port. The canalization of the Moselle, a project often discussed before the war, which would allow of the transport of the Briey ores to Thionville, whence they could be sent, along the Rhine, to Rotterdam, seems likewise one of only distant realization. In these circumstances the low percentage of the Briey ores is an obstacle, in these days of heavy freight charges, consequent of post-war conditions, to any extensive export trade with Great Britain. It could only be on a lowering of these transport costs, and in combination with a return trade in metallurgical coke for use in Lorraine blast furnaces, that such a trade could have any chance of early development. Its importance is, however, so considerable that many minds have been occupied with its solution.

It has already been pointed out that only the richer ores of the Briey field could constitute the material for an export trade to Great Britain. The situation may be said to resemble very closely that of the Westphalian and Belgian blast furnaces, for which the question of railroad transport becomes increasingly important, and for which therefore it is sought to secure increasingly high percentages of iron in the ores transported.

The author has hitherto spoken only of Dunkirk as the French port of embarkation. This does not mean that no others are available. Calais might be a factor in the solution of the problem, while in Belgium, where the economics of railroad administration receive rather more attention than they do in France, the ports of Bruges, Ghent and Antwerp might well enter into consideration.

Ores Best Suited for Export

The ores suitable for export to a considerable distance belong to the great metalliferous formation which was discovered on French territory, extends into Luxemburg, and is found, owing to faulting, in Bel-

gium as well. The production of this vast ore field constituted, before the war, 28 per cent of the whole world output of iron ore, and was exceeded only by one other deposit, that of Lake Superior region in the United States, the ores of which were, however, only richer by 1 or 2 per cent of iron than the Briey ores.

The French portion of the deposit, now that Lorraine has been completely recovered, is by far the more important, seeing that in 1913 it yielded 41 millions of tons as against 6½ millions in Luxemburg and some tens of thousands of tons in Belgium. The increase in the production was most marked in the portions of the field most recently opened up, that is in the Briey basin. This basin had by 1913 reached a production of 15,103,849 tons out of a total of 20 millions from the whole of French Lorraine, or over 75 per cent.

Before its discovery and opening up the iron works of Lorraine had to add to their siliceous ores lean, chalky ores, or even lime, from other regions. They have since been able to use these rich limey Briey ores, thus increasing the iron content of their burden and diminishing their coke consumption. Hence they have been able to compete at far lower prices and under far more favorable conditions, with other countries.

The Older French Lorraine Field

The older French Lorraine ore field extends over 168,910 acres, and is divided into 114 concessions, which, from the standpoint of French mining law, comprises all that is actually workable. There are still thousands of acres which might form concessions either to the north, in the siliceous ore field of Crusnes, or to the south, around Nancy and the Forest of Haye. The entire surface may be estimated at 178,000 to 186,000 acres of workable ore as against 106,260 acres in recovered Lorraine, 8890 acres in Luxemburg, and a few hundreds of acres in Belgium. Of the total, two-thirds belonged to France even before the war, and France now possesses 97 per cent of the entire area.

After dealing briefly with the geology of these ore fields, the author states that the ore is a hydrated oolitic hæmatite formed of a number of small grains consisting of concentric layers, varying from microscopic dimensions to the size of a grain of millet seed. The filling between the grains may be calcareous or siliceous and the oolitic particles are much higher in iron than the cement, containing up to 50 per cent of iron in carefully separated portions. The color varies from light yellow to gray and from red to green or dull blue.

The characteristic feature of the ore is the phosphorus content, which for many years prevented its employment. This feature now constitutes one of its greatest advantages. The proportion of iron phosphide is, throughout the whole formation, practically uniform, and only varies between 1.7 and 1.9 per cent. It is therefore entirely unnecessary to estimate the phosphorus in works using the ore, or in the resulting pig iron which, as compared with other ores, such, for example, as Swedish, is a great advantage.

The iron content of the ore rarely exceeds, in ore dried at 110 deg. C., 42 per cent, and is generally between 32 and 40 per cent, in the seams mostly worked. It often falls to 30 per cent, or even 25 per cent in certain ferruginous chalk used as fluxes. In the Briey district the ore usually runs between 36 and 40 per cent of iron. As an exception there has been found, in a particular mine in the Landres field, a kind of coarse lenticular bed 60 centimeters in thickness, formed of a black ore resembling magnetite, this deposit occurring in the middle of the gray bed. The percentage of iron has exceeded 60.

The ordinary ore contains so much moisture and carbonic acid that it loses from 8 to 12 per cent of its weight on drying at 100 deg. C., and 14 to 24 per cent on roasting at a dull red heat. Attempts have been made to profit by these properties and to roast some of the ores intended for distant transport so as to avoid carrying a useless load over considerable distances. It would be easy thus to obtain from the Briey basin ores containing over 45 per cent of iron and sometimes reach-

ing 50 per cent, but the resulting product readily falls into powder as the result of handling and is likewise highly hygroscopic. Hence these attempts had speedily to be abandoned, and at present the ores of Briey and of other Lorraine ore fields are used entirely in the raw state.

The Nancy Ores

The Nancy ore is usually highly silicious, containing from 12 to 16 per cent of silica as against 6 to 9 per cent of lime. In some localities it becomes calcareous and contains 14 per cent of lime and 10 per cent of silica, as in the Forest of Haye deposits. The iron ore percentages are usually low, being about 32 to 34, and rarely exceeding 35 per cent. From the point of view of iron ore resources the Nancy basin, including areas beneath the Forest of Haye not yet conceded, would appear to contain 200 millions of tons of workable ore. It was the only ore field which, during the war, remained available, being beyond enemy occupation. Output was naturally greatly reduced, as only French works were deriving their supplies from the ore field, and foreign works such as those of Belgium and in the Sarre, which were ordinarily customers, and the greater part of the works in the north of France, and connected with the ore field by waterways, found themselves completely isolated. The production of the Nancy ore field since 1907 has been as follows:

Tons		Tons	
1907.....	1,942,000	1914.....	1,030,000
1908.....	1,963,000	1915.....	118,000
1909.....	1,959,000	1916.....	697,000
1910.....	2,091,000	1917.....	846,000
1911.....	2,041,000	1918.....	527,000
1912.....	1,974,000	1919.....	669,000
1913.....	1,917,000	1920.....	816,000

Briey a New Field

The Briey ore field has only fairly recently been opened up and the three subdivisions of Landres, Orne and Tucquegnieux were fully outlined by 1902. The Orne ore field, the oldest known and worked, is situated to the south of the Avril fault. Shafts were opened in the following order: Homécourt (Fond de la Noue), 1897; Joeuf, 1896; Auboué, 1900; Moutiers, 1901; Jarny, 1909; Droitaumont, 1910; Valleroy, 1910, and Giraumont, 1914. The output of the Orne ore field in 1913 constituted 43.2 per cent of the whole output of the Briey region. It has diminished considerably since the war, the Germans having allowed several of the mines to become flooded, or having rendered them unworkable, which has necessitated, since the armistice, heavy repair work, besides which the bad mining methods followed by the German engineers have here, as elsewhere, greatly jeopardized the future methods of mining these deposits.

In the Landres ore field the gray seam, the only one workable, compensates greatly for the absence of the others. It varies in thickness from 5 to 9 meters, except in the west, where it falls, at Dommary, to 4 meters, and eventually pinches out. Throughout the Landres region the iron and lime in the ore, as dried at 110 deg. C., is always in the vicinity of 50 per cent, and varies but little from this proportion. During hostilities the Landres mines, such as those at La Mourière, Joudreville, and Landres itself, were worked by the Germans occupying the region under conditions no better than those of the Orne iron mines.

The Tucquegnieux ore field, which forms the third subdivision of the Briey basin, extends to the east of the Bonvillers, Norroy, and Audun-le-Roman faults, and to the mouth of the Avril fault which marks its southern boundary. Four pits are working, at Sancy, Tucquegnieux, St. Pierremont, and Andernay. They were opened successively in 1904, 1906, 1909 and 1910. The gray seam predominates and its thickness reaches 6 to 7 meters. The ore is fairly high in iron, particularly in the environs of Mairy, and has a markedly calcareous gangue.

Five Billion Tons in French Lorraine

After giving details of the deposits at Longwy, Crusnes, and the ore fields of recovered Lorraine, the author summarizes the resources of the French Lorraine deposits. He states that if all the ore fields be

taken into account it may be estimated that the ore resources of the Nancy field amount to 200 million tons; those of Longwy to 275 millions; those of Briey to 2000 millions, and those of Crusnes to 500 millions. To this estimate must be added the 1750 millions of tons attributed by Mr. Kohlmann in 1913, which gives nearly 5000 millions as the total iron ore reserves of French Lorraine. The ores of recovered Lorraine are obviously lower in grade, and not worth the long journeys required before they could be delivered to British centers. From this point of view it is only the Briey ores which need more detailed discussion.

In order to obtain, under the most favorable conditions, a uniform average composition, many of the mines of Briey have built huge bunkers into which are delivered throughout the day the ores derived from various working places, and where what may be termed automatic mixing takes place, with the result that the lower portions, on leaving the bunkers, yield extremely uniform results. The bunkers at Landres and at Sancy, for example, have a capacity respectively of 16,000 and 12,000 tons. Another factor which contributes to the uniformity of the outputs of any given mine is the degree to which the workings have extended, so that the bunkers receive ore from widely different working places in the same mine. It is thus easier to ascertain the average composition of the output of a mine which has been well opened out and is being fully worked than that of a new mine which has just begun working. In these circumstances it may be said, broadly, that the Briey ores of the gray seam, the only one hitherto worked, yield, on a sample dried at 110 deg. C., 36 to 42 per cent of iron, 9 to 14 per cent of lime, and 4 to 7 per cent of silica, the average moisture of the undried ore being 8 to 11 per cent.

The ratio of phosphorus to iron varies within exceedingly narrow limits, and corresponds exactly with that required in the manufacture of basic pig iron. It should also be noted that the sum of the iron and the lime content of the Briey ore amounts very regularly to 50 per cent.

These ores require less coke in blast furnace working than their low iron content would lead it to be assumed. A mixture of the Briey ores with the ordinary silicious ores of Lorraine leads in practice to a consumption of coke varying from 950 to 1050 kg. per ton of pig iron (19½ to 20½ cwt.). This easy reducibility is a property of no mean value.

Export Ores of Normandy, Anjou and Brittany

The iron ores of Normandy, Anjou, Maine and Brittany are, from many points of view, and particularly from their geographical situation, the most suitable of all the French deposits for British iron works. All the mines are in close proximity to the sea. Those of Segré, in the Anjou ore field, the farthest from ports of embarkation, are only 85 and 135 kilometers distant by rail from Nantes and St. Nazaire respectively, while the Ferrière and Halouze mines, the farthest south of the Normandy mines actually in operation, are within 75 and 80 kilometers of Caen.

The freight question is likewise favorable. The whole of western France normally looks for its coal requirements to foreign countries and, because of its proximity therewith, more especially to Great Britain, while the colliers can count on return cargoes of iron ore, a factor which must exert its influence on the freights each way. Taking the pre-war year 1912, when things were normal, and conditions of the kind to which all look forward in the future, the imports of coal at the three ports of Nantes, St. Nazaire and Caen alone amounted to 2,289,797 tons, and those of coke to 19,686 tons. Out of this total of 2,309,483 tons of fuel, no less than 1,976,536 came from Great Britain. Yet in this year the exports of iron ore from Caen to Great Britain amounted only to 93,604 tons, while those from Nantes and St. Nazaire together did not equal this amount. Before the war a large number of important German companies had acquired considerable interests in the iron ore mines of Western France, and a heavy trade with Westphalia had commenced, which militated against all attempts to foster an ore trade with Great Britain.

The Normandy deposits spread over the three de-

partments of Calvados, La Manche and l'Orne. They are in point of importance the second largest deposits in France, notwithstanding that, according to the 1912 statistics, they contributed, as compared with Meurthe and Moselle, so small a proportion of the total output. The production of ore from the Normandy mines had appreciably increased during the years which immediately preceded the war, and the 1913 output of 831,637 tons would have justified the hope that in 1914 extractions would have reached a million tons. Great developments were in progress at the Soumont mines.

Since the war the situation has greatly changed. The northern works, such as Denain, Isbergues, Valenciennes and Pont-à-Vendin, have been completely destroyed by the Germans, or so vitally injured that it will take many years to restore them. This is one of the reasons for the notable decrease in the iron ore production of Normandy. The Caen works, which drew ore from the Soumont mines, taken over by a company which has eliminated the German element, cannot develop to the extent wished for. Hence the Normandy mines must look for their own development to the export trade with which they can easily cope, while meeting all demands likely to be made upon them for home consumption.

If it be difficult to give definite estimates of the amount of the Normandy deposits, it is still more premature to attempt to do so in regard to those of Anjou and Brittany. From a geological point of view these deposits considerably resemble the former.

During the war production of iron ore in the Anjou-Brittany ore fields fell off considerably, but even with existing appliances the mines of these regions should be capable of an output of 1,000,000 to 2,000,000 tons annually of ore high in iron if rather silicious, and containing a low percentage of phosphorus. Of this output two-thirds could easily be exported. The ports of embarkation are near to the deposits, and are already important centers of the coal trade from abroad.

While, therefore, awaiting more favorable conditions in the Briey district, British iron works can continue, in the future as in the past, to import into Great Britain the ores of Normandy, Anjou and Brittany which are unaffected by the transitory conditions which render the transport charges from eastern France for the moment prohibitive.

A late addition to the above paper was also presented in the form of a note on the devastation of the Briey ore fields only, giving the latest information. It appears that at the outbreak of the war there were 18 mines in operation in the Briey district and one being sunk, employing about 15,000 workmen. During the beginning of the war the field was under the guns of Metz, and for the greater part of the war it was in German possession. The works were dismantled and the mines were operated for the German industry. Only the precipitate nature of the German retreat prevented the destruction of the mines when the Germans left, as was done with the coal mines. Further particulars were given, to the same general effect, but it seems hardly necessary to dwell in too great detail on what may be termed the devastating aspect of the meeting.

Discussion

Prof. Henry Louis congratulated M. Nicou on his very admirable résumé of the iron ore resources of France, and said that his own magnetometric measurements had confirmed the opinion of M. Cayeux that the Normandy synclines were very deep. He ventured, however, to differ from the author when he said that Great Britain for many years to come must depend on foreign ores. He thought the author had been misled by the pre-war position, when about one-third of the ore smelted in British blast furnaces was imported. That was because it was cheaper and more convenient to import ores, owing to railroad freights being high and shipping low. As a matter of fact, Great Britain was better off as regards basic ores than either France or Germany. Home production had been greatly developed during the war and more and more basic steel

was made every day. According to the Geological Survey, Great Britain had 3400 million tons of workable mesozoic ores, as compared with 5000 million tons in France. There were also 7000 million tons of coal-field ores in Great Britain. He had no hesitation in saying that the Geological Survey had much underestimated British resources, but that did not matter as, under present conditions, much of the ore was not economically workable. He thought a change would take place in the near future in British ore requirements, and that there would be a demand for rich ores to work with a minimum of coke in the blast furnace, in view of the high cost of fuel.

H. K. Scott pointed out that Professor Louis had omitted to consider that the British lean ores were much further from the blast furnaces than was the case in Lorraine, comparing ores of equal quality. He thought the cost of transport would make it impracticable to import ores from the east of France. As regards the large estimates of ore reserves which had been given, it should be remembered that most of the ore would have to be mined by underground methods,

and it would be interesting to know what proportion would be actually got.

François de Wendel agreed with Professor Louis that the British ores had not hitherto been used as much as they might be.

Sir Hugh Bell said that British iron masters are now beginning to find that it is profitable to work the home ores, due to the many improvements made in blast furnace practice in recent years. The iron trade is essentially an international trade, and the best place for an English iron works is on the banks of a river—preferably the Tees. In the next few years the world would want all the steel that the iron masters could make on both sides of the Atlantic, on both sides of the Channel, and—if he might venture to say so—on both sides of the Franco-German frontier.

The business session was then adjourned until the following day. In the afternoon a deputation of the institute laid a floral tribute on the tomb of France's unknown warrior, and a deputation from the Council was received by the President of the French Republic at Rambouillet.

Sources of Iron and Steel Imports

WASHINGTON, Sept. 19.—The Iron and Steel Division of the Bureau of Foreign and Domestic Commerce has compiled a table showing the chief sources of iron and steel imports into the United States for the first seven months of 1921 as follows:

	Canada	Belgium	China	Sweden	United Kingdom	Japan
Total	13,569	7,801	5,823	2,702	2,693	2,002
Pig iron ..	1,692	5,007	5,823	100	400	2,002
Rails	11,692	.....	.....	.....	.....	.....
Billets .....	.....	2,422	.....	246	.....	.....
Steel bars ..	40	144	.....	1,093	579	.....
Sheets and plates	9	160	.....	78	1,360	.....
Bar iron	56	128	.....	756	53	.....
Wire rods ..	49	.....	.....	429	25	.....
Tin plate ..	31	.....	.....	.....	276	.....

The six countries accounted for all but about 2000 tons of the imports during the period under consideration. Australia contributed one shipment of pig iron; Germany sent 440 tons, fairly evenly divided between bars and sheets and plates; and Czechoslovakia sent 350 tons of bars. Other small shipments came from France, Austria, Norway, and Hongkong.

Imports of iron and steel into the United States totaled only 37,050 long tons during the first seven months of 1921. This amount is considerably below the pre-war rate, which ranged from 250,000 to 400,000 tons a year, and is much smaller than the figure for 1920, when 138,000 tons were imported up to the end of July. Pig iron alone amounted to more than 85,000 tons in the first seven months of last year, and rails were up to nearly 27,000 tons.

Navy Department Awards \$310,000 Crane Contract

The Navy Department has awarded a contract to the McMyler-Interstate Co., Cleveland, coal and ore handling machinery, etc., for two 50-ton dry dock cranes, one to be erected on the dry dock at South Boston and one on the new dry dock at Puget Sound Navy Yard at Bremerton, Wash. The amount of the contract is about \$310,000. The crane for South Boston is to be completed in 250 days and that for Puget Sound, in 280 days.

The cranes will be steam-operated and will travel on rails having a gage of about 22 ft., with 16 wheels on each side. The truck design as developed by this company to meet the Government requirements and specifications is of considerable interest from an engineering point of view.

The cranes are of the traveling, revolving type, with a movable jib or boom. They have a capacity of 50 gross tons at a maximum radius of 90 ft. 6 in. on the

main hoist and a capacity of 15 gross tons at a maximum radius of 129 ft. 6 in. on the auxiliary hoist.

A similar crane, though somewhat smaller in capacity, was furnished by this company at the Puget Sound Navy Yard about 20 years ago. This company has supplied the majority of shipbuilding cranes in the United States Navy Yards during the last 10 years. Especially noted among these installations is "the League Island," the largest capacity crane in the world, designed for, and furnished to, the Navy Department at the Philadelphia Navy Yard at a cost of about \$1,000,000 and completed in December, 1919.

Cost of Living Again Rises

Figures of the Bureau of Labor Statistics show an advance of about 3 per cent in the cost of living for August, compared with July, though the latest figure is 39 per cent below that for August, 1920. The average wholesale prices of the nine groups of commodities listed are 52 per cent above the average for 1913. Household furnishings are still, as for many months, the highest item on the list; and building materials have for months held the second highest place.

Metals and metal products, at 20 per cent above 1913, show the lowest price of all, with the sole exception of farm products, 18 per cent above 1913. The metal group has fallen 4 per cent during the month, and has lost 78½ per cent of the amount by which 1920 exceeded 1913.

In the following table, all figures given, except

	1920 August	1921 July	1921 August	Percentage Reduction A*	B†
Farm products	222	115	118	47	85
Food, etc.	235	134	152	35	61½
Cloths and clothing	299	179	179	40	60
Fuel and lighting	268	184	182	32	51
Metals and metal prod.	193	125	120	38	78½
Building materials	328	200	198	40	57
Chemicals and drugs	216	163	161	25	47
Housefurnishing goods	363	235	230	37	50½
Miscellaneous	240	149	147	39	66
All commodities	250	148	152	39	65
Finished steel	239	148	141**	41	70½
Retail cost of food	207	148	155	25	48½

*Reduction in one year.

†Percentage cut from the excess of August, 1920, over the average for 1913.

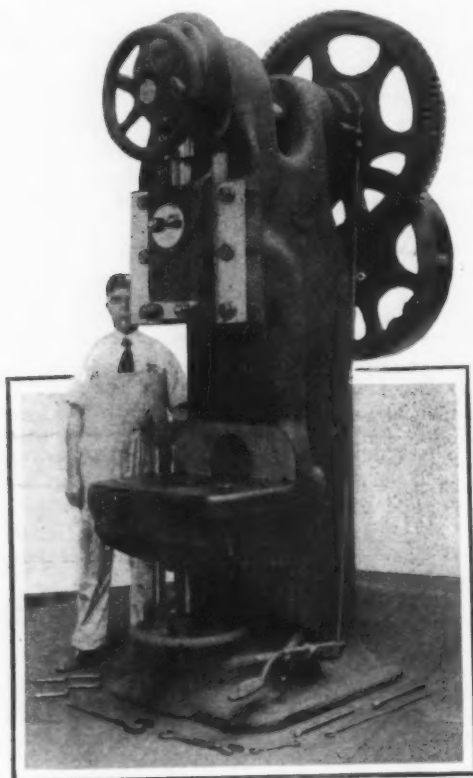
**Since, reduced to 137.

for the retail cost of food, are wholesale prices. All are from the Bureau of Labor Statistics, except those for finished steel, which show the averages for the months indicated of THE IRON AGE composite figures. All are based on 1913 at 100. The last column shows the extent of "liquidation" during the past year.

Adjustable-Bed Punching Press

A new punch press the bed of which has a vertical adjustment for varying the distance between the bed and the ram has been recently brought out by the Ferracute Machine Co., Bridgeton, N. J. It has been designed for work requiring a long stroke and unusual height between bed and ram.

A great deal of attention has been given to strong and rigid connection between the bed and the frame. This is accomplished by means of heavy steel bolts, in addition to the support given by the 4-in. steel adjusting screw extending upward from the base. A pro-



The Maximum Adjustable Distance Between Bed and Ram Is 30-In.

jection at the back of the bed fitting a vertically planed recess or guide in the frame is designed to keep the bed parallel with the bottom of the ram under all conditions. These devices, it is said, eliminate all appreciable spring.

The press as shown in the accompanying illustration may be used for horning by inserting a horn in the 9½-in. hole in the frame at back of the bed. The hinge formed by the stud at the side of the press permits of swinging the bed out of the way when the machine is used as a horning press.

The ram has 3-in. adjustment and the bed, 9-in. A distance of 30 in. is given between the bed when it is adjusted to its lowest position and the ram when it is at the top of its stroke and highest adjustment. The ram stroke is 8 in. The press exerts a pressure of 70 tons and weighs 13,200 lb.

Metal Working in Kalamazoo

KALAMAZOO, MICH., Sept. 20.—There are 41 concerns in Kalamazoo engaged in the manufacture of products from iron, steel, copper and brass. The metal working industry is thus seen to be easily second in importance in this city and admits supremacy only to one other, that being paper making.

While complete reports are unavailable, the total resources of Kalamazoo's metal companies is in excess of \$12,000,000. Their combined authorized capital is approximately \$8,000,000 and the aggregate subscribed capital is over \$5,000,000.

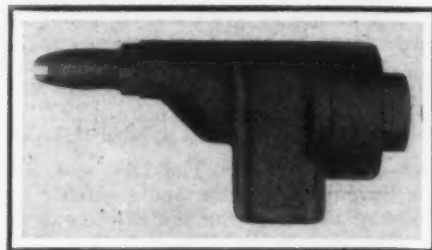
The corporation reports in the office of the county clerk show in detail the following statements for 1920

and 1919: In 1920 the combined resources totaled \$10,733,422.49 as against \$9,575,020.84 for the previous year, or a gain of \$1,158,401.65 for the twelve months. During the same period there was a shrinkage in capital from \$4,270,767 for 1919 to \$4,217,627 for 1920.

Improved Oil Burner

An oil burner constructed to separate the gas fumes from the fuel oil, permitting the oil to pass through the orifice without pulsation, is being marketed by the Oil Burning Equipment Co., 5217 Germantown Avenue, Philadelphia.

Gases and oil, passing through the same orifice in a burner cause a fluctuation which sometimes results in extinguishing the flame and which is in most cases a detriment to complete combustion. Low gravity oil has to be heated to a comparatively high temperature to permit of atomizing and when heating the oil a cer-



Gases Escape Through Separate Channel in Top of Burner

tain amount of gas is produced. The burner described is designed to relieve by a separate channel the gas so generated.

The burner is shown in the accompanying illustration. The oil is held in suspension in the oil well, which is considerably larger in volume than the orifice through which the oil passes. The gases are thereby allowed to rise to the top of the well and escape through the gas channel in the top of the burner. In case any oil should pass through the opening with the gases, such oil, it is claimed, is heated to a high temperature in passing over the steam chamber and practically gasified in the gas channel. It is further claimed that even should the oil pass all the way through the gas channel to the burner tip it will encounter the steam coming from the mixing chamber and be completely atomized.

The burner is adaptable to heating and annealing furnaces as well as for other purposes. The tips are made in several types and sizes to meet the various requirements of burning fuel oil.

European Iron Ore Resources

France is now the leader among European nations in tonnage of iron ore reserves, with 35 per cent of the total for the Continent; the United Kingdom following with 18 per cent; Sweden with 12.5 per cent; and Germany with 11 per cent. Central and southern Russia, Spain, and Norway are the only others possessing more than 2 per cent of the total, according to a recent report issued by the U. S. Geological Survey (Bulletin 706); numerous maps, statistical tables, and charts relating to principal ore-bearing districts are included in a way to make a comprehensive and valuable report on this subject.

The St. Louis Coke & Chemical Co. is now supplying from its Granite City plant 3,000,000 cu. ft. of gas daily to the nearby towns of East St. Louis, Belleville and Edwardsville. This by-product gas is being bought and distributed by the St. Clair County Gas Co., which formerly manufactured gas for those cities by the use of oil. The Granite City company has a capacity of 8,000,000 cu. ft. of gas daily.

President Campbell Discusses Wages

Conditions in Youngstown Compared with Those in Other Districts—Why the Last Reduction in the East Was Not Followed

IN a message to employees of the Youngstown Sheet & Tube Co., Youngstown, Ohio, President James A. Campbell discusses wages and business conditions in a very frank manner, pointing out some of the difficulties which confront the industry at this time. He solicits co-operation of employees "in meeting a situation which is the worst in the history of this company, if not in the entire history of this district."

"Perhaps the worst feature of the situation," he states, "is the fact that there seems to be no immediate prospect of its becoming better. There are some hopeful signs, but as yet no assurance of permanent improvement. That conditions will eventually change for the better we, of course, all believe, but when this will happen no one can foresee. There is great danger that no material improvement will take place before the end of the coming winter, and that in the meantime our difficulties may increase, rather than decrease."

"Mills in the Youngstown district are handicapped by a number of things entirely apart from the general depression and the lack of demand for their products. One of these is the extremely high freight rates, which make their freight costs over \$7 per ton for delivery of products in the Chicago district, and rates throughout the West and Northwest are on the same high basis. On all Eastern orders our differential over Pittsburgh is about 90c. per ton on domestic and 60c. per ton on export business, and it is much greater as compared with Johnstown, Buffalo and especially mills located east of the Alleghenies. In addition to increasing the cost of delivering our products to both East and West, the last 40 per cent increase in freight rates had added very materially to our costs of producing everything we manufacture. For instance, the cost of assembling materials for a ton of pig iron is now about \$10, while in 1914 it was about \$5. Freight on coal has increased since 1914 from 70c. per ton to \$1.50 per ton. Most of the larger plants in the Pittsburgh and lower lake

front districts have advantages of water transportation not enjoyed by inland points. So that any advantages we may have in the matter of costs are not sufficient to compensate for the disadvantages arising from the higher freight rates we must pay on shipments both East and West. Prior to the last advance in freight rates, Aug. 26, 1920, we were in stronger competitive position than at present, but when freight rates are restored to a normal basis, this situation will be corrected."

"The wage rate in effect east of Pittsburgh is 25c. per hr. Buffalo has the advantage of a wage rate of 26c. per hr., or about 14 per cent less than that in this district. To meet the last reduction in the East, made July 15, this district should now be paying labor on a basis of 27c. per hr., instead of 30c., which would place it on the same relative basis always heretofore maintained."

"We did not follow this last wage reduction in the East because we believe that labor in the steel industry should not be reduced further until similar reductions have taken place on the railroads, in the building industry, in all of the mining districts, in textile mills, shoe factories and other industries."

"The conditions outlined above have combined to make operation of our plant difficult and costly. We have been and are losing money, and because of the extremely low prices prevailing, our losses will continue until selling prices are higher, or we are able to operate to capacity. A number of plants confronted by these conditions have been shut down indefinitely and their orders filled through other plants where costs are lower."

"What we are doing is to meet conditions as we find them from day to day, trying to secure our fair proportion of the business going, in order to give our workmen employment and help to carry as much of the necessary overhead expense as possible. But what can be done in this direction is limited by our ability to meet competitive prices."

Professor Commons's Views on Labor Problems

LABOR should not go in for legislation looking toward public instead of private ownership nor for participation of labor on boards of directors of corporations, is the opinion of Prof. John R. Commons, head of the economics department of the University of Wisconsin, in an article, "Basic Principles for Labor," which will appear in the "Official Labor Review," the annual publication of the La Crosse Trades and Labor Council, La Crosse, Wis.

Professor Commons is the man generally credited with the drafting of the Wisconsin workmen's compensation act—a piece of legislation that has since been copied in almost every State in the Union. He was also largely responsible for the unemployment insurance bill which was introduced in the last session of the State legislature by Senator Huber and defeated.

"Experience shows," writes Professor Commons, "that neither politics nor labor as a class can manage industry, nor assume the responsibilities of management. Industry cannot be efficiently managed on the basis of popular election of the boss. Efficient managers are self made in the struggle for profits."

"If this is so, then private ownership means great economic power in the hands of business men." Power brings responsibility. The best that legislation can do is to enforce responsibility where irresponsible business does not willingly accept it. Our child labor laws,

minimum wage law, accident compensation law and others, are framed on this theory.

"The present business system is responsible for the great bulk of unemployment. Business should be required to assume a share of this responsibility instead of throwing the burden solely on labor. Business men are the only people in a position and with the ability to prevent unemployment. The accident compensation law has induced them to prevent accidents, also to insist that their employees shall prevent accidents, and requires them to bear something less than one-half the burden of unprevented accidents. The Huber unemployment prevention and insurance bill, before the recent legislature, applies the same idea to the prevention of unemployment, by requiring business to compensate workers for about one-third of the loss from unprevented unemployment."

"Federal legislation looking toward prevention of business cycles of prosperity and depression, by better control of money, credit, and banking, along the lines proposed by Irving Fisher and the Stable Money League, is just as much needed for labor as for farmers and business men. This is a big and difficult problem, to which labor should give as much attention as is given by bankers, business men, and farmers."

"Taxation is next in importance for labor. Labor should not try to throw increased taxes on business."

The prosperity of the farmer and business man means better business and more employment. Labor should endeavor to relieve business and farming of taxes and should help to throw the increased burden upon property and income that can not be shown to aid business men or farmers in increasing the prosperity of business and agriculture. The Grimstad bill providing a surtax on bare land values, and exempting buildings, improvements, machinery, personal property, standing timber, and soil fertility from further increase in taxes is an important step toward increasing the profits, wages, and employment that are necessary for prosperity.

"Labor's right to organize is no greater than employers' right to organize, and if labor wants to exempt unions from penalties, damages, and boycotts, it should be willing to exempt employers from penalties from blacklists as well as lockouts. In this respect the British trades disputes act of 1906 is better than the American idea of exempting union of labor, but not exempting unions of employers. The British act treats unions of employers to keep down wages exactly like unions of employees to keep up wages. Both are exempt from penalties. Legislation regarding these two kinds of unions should be entirely separated from the anti-trust laws which try to prevent combinations from keeping up prices. The wage bargain is different from the price bargain. Consumers are not organized; hence the need of anti-trust laws. And employers had not organized against labor until labor first organized against employers. Labor should advocate repeal of the anti-blacklisting law when it asks for exemption from the anti-trust law."

Another article of interest is "Unemployment Insurance" by State Senator Henry A. Huber, father of the unemployment insurance measure which was defeated at the last session.

Senator Huber explains the theories back of the unemployment insurance proposal and predicts that another session will see the measure—or one embodying many of its clauses—written into the laws in this State.

American Plan Adopted

Armour & Co., Swift & Co., Wilson & Co. and the Cudahy Packing Co., leading packers, have adopted the "American shop representation plan," thereby putting out of existence the closed shop in their plants. Matters of reciprocal importance between employer and employee are to be disposed of by councils made up of representatives of the company and of persons employed by it, and all men and women are eligible to election as representatives who are American citizens or who have taken out first papers. The plan was adopted after an expression of the workers of these concerns showing a large majority in favor of it. The shop council is the unit representing the workers and both parties to the negotiations have the right of appeal to a higher council and then to a national council standing for the branches of the company throughout the country.

All Independents Adopt Frick Schedule

UNIONTOWN, PA., Sept. 19.—Wage rates in the Fayette County or Connellsville bituminous district were stabilized last week when the last of the independents announced increases to the H. C. Frick Coke Co.'s present scale, which is that of November, 1917. W. J. Rainey, Inc., whose second reduction, to a point 15 to 20 per cent under the Frick scale, precipitated strikes at its plants and sympathetic strikes at other nearby plants, announced that the Frick wage scales would be effective at the Rainey plants but that operations would be resumed for the time being only at Paul, Stewart and Fort Hill plants, and possibly Elm Grove. The company, it was said, would mine only sufficient coal to supply the Rainey-Wood by-product ovens at Swedeland. It is expected that resumption will come at an early date at the Mt. Braddock, Revere, Royal and Allison plants.

Oliver-Snyder Steel Co. and the Washington Coal

& Coke Co. also posted notices announcing the return to the Frick scale. Rainey was the only independent operation to make the second cut; return to the Frick scale by other independent operations, meaning an increase of approximately 10 per cent.

Announcement was made Saturday that coal production would be resumed at the Leisenring No. 1 mine of the H. C. Frick Coke Co. on Monday, Sept. 19. It is expected that other Frick mines will be started during the next few weeks. Until this week, the Frick company has been operating at about 40 per cent coal production. No ovens are in operation.

One hundred and nineteen ovens were fired at the Garwood plant of the Aetna Connellsville Coke Co. this week, it being reported that the company has landed a furnace coke contract for 5000 tons monthly during the remainder of the year at around \$3.25 a ton. One coke sale of considerable magnitude to a jobber at \$3.40 was reported in the region this week. Furnace coke quotations have been increased now to \$3.50. There is a better demand. There is also a slight increase in foundry coke output in the region.

May Cancel Contracts

Employees of the Youngstown Sheet & Tube Co., Youngstown, Ohio, have been advised by President James A. Campbell that those who purchased stock in the company under a special contract, providing for deferred payments, may cancel such contracts at any time. He says:

"When they were made, conditions were such that these contracts gave certain advantages to those holding them, but these conditions have changed in a way that no one could anticipate. The contracts are disadvantageous to the subscribers, and unless the holders have some special reason of their own for completing them, we would advise that they be cancelled and will be glad to return the money paid on them."

"It is our hope that those of our employees who have carried such contracts will benefit considerably by the fact that they have thus saved money that otherwise might have been needlessly spent and is now very useful. At the same time we regret that conditions should have prevented them from becoming stockholders in the company under a plan devised solely for their benefit."

Increase in Salaries of Patent Office Examiners Urged

The American Bar Association, at its recent meeting, held in Cincinnati, as stated by Clarence J. Loftus, counsellor in patent and trade mark causes, Chicago, who attended such meeting, adopted and approved the report of the patent section, which report, among other things, recommended that the salaries of the Patent Office examiners be increased substantially, and that such increase be assumed by raising the fee for filing applications for patents from \$15 to \$20, and urged that the matter be taken up with Congress to the end that the necessary enactments be promptly passed.

Appeal to President Harding

WASHINGTON, Sept. 20.—Appeal has been made to President Harding, according to Vice-President David Williams of the International Association of Machinists, to expedite the payment of \$1,500,000 to 38,000 machinists and electricians awarded to them as employees of the Bethlehem Steel Co. by the former National War Labor Board. The War Department has ruled that it cannot pay the money to the employees in the absence of sanction by Congress, which the employees are seeking to have hasten action through request of the President.

A new method has been developed at the Northwest station of the Bureau of Mines, Seattle, Wash., for the determination of metallic iron in sponge iron, which has been found to be more accurate, simpler and more rapidly performed than any of the existing methods.

MACHINE SPEED CONTROL

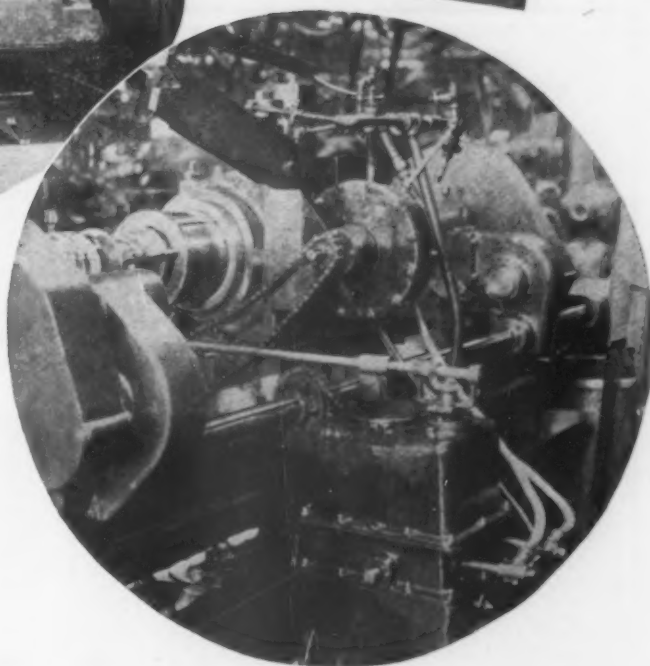
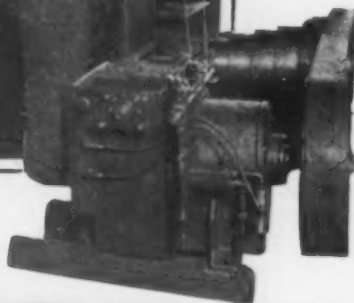
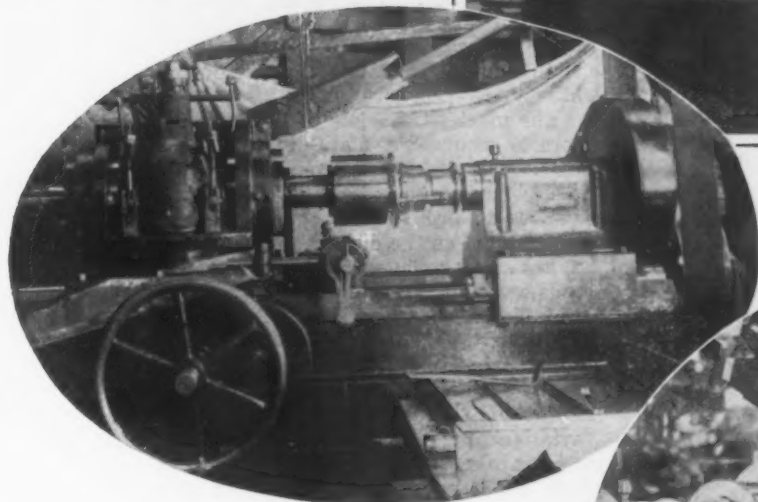
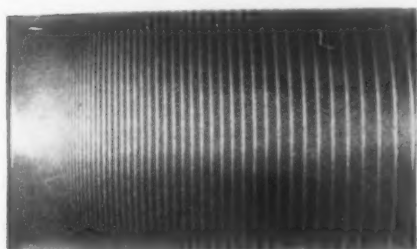
Oil Pressure Transmission for Control of Speeds and Feeds—Device Described

A recent development in the field of speed-control devices, adaptable to the variety of uses for which variable speed power transmission is required, is represented by the Oilgear system, brought out by the Oilgear Co., Milwaukee. It was developed especially for application to the feeding and rapid traversing of machine tool carriages and rams, but is said to be adaptable also to textile, paper mill, chemical and other machinery requiring variable speeds.

The device consists essentially of a pump which can

the tool slide is necessary. The gradual change from a fine feed of 0.003 in., at one end to a coarse feed of 5/16 in., at the other, which this feed control gives without changing any gears or stopping the spindle, is graphically shown in the separate illustration.

An advantage claimed for this type of feed gear for heavy machine tools is the securing of rapid traverse movement without any additional mechanism, enabling the operator to move heavy carriages and rams promptly and without fatigue. The hydraulic feed permits the operator to readily increase the feeds when cuts become lighter, back out the tool for examination of cutting edge, and return it quickly into the cut without any disconnection of friction clutches, etc. Another advantage on many production jobs is the



Two Types of Feeding Motors Are Employed. The rotary type of motor is shown at the right, geared to the lead screw of a lathe. The position of the control handle may be seen in the double-headed lathe above. The upper illustration at the left shows graphically the gradual change of feed from very fine to coarse which can be obtained without changing any gears or stopping the spindle. The larger type of machine, shown in connection with a boring mill, permits of an infinite number of speed changes through a single control handle

be adjusted through a wide range of capacity and a motor driven by the working fluid, oil, received from the pump. The pump is driven from the machine tool countershaft, the motor being attached to the carriage or ram the feed of which it is desired to control. Two types of feeding motors are employed: the direct acting pushing cylinder, and the rotary. The pushing cylinder type is used when space conditions permit, and in equipping old lathes it is mounted at the rear of the bed behind the headstock, the piston rod extending toward the tailstock and being bracketed to the rear part of the carriage. The rotary type, shown in the accompanying illustration geared to the lead screw of a lathe, is employed in the case of very long machines and frequently for cross feeds, where screw control of

ability to use two or three different feeds in quick succession on short cuts.

In many cases, it is said, the improvement to be effected justifies installation of the device on machine tools already in operation. Such a case is the double-headed boring and tapping lathe shown. It will be noted that the control handle is within easy reach of the operator. Before installing the device the operator had to turn the large hand wheel more than 70 turns, requiring more than one-half minute of hard work in every 8-min. period, in order to back out the tools and place a new casting in the jig. In addition, the facing cut had to be fed by hand, as the existing feeds were not suitable. It is also noticed that the operator is no longer reluctant to run the tools back for occasional

examination. The speeding up of the rapid traverse and economies due to correct feeds and greater convenience of manipulation, is said to have effected in this case a 25 per cent increase in output.

Delivery of fluid from the feed controller, varied in quantity and direction, compels the feeding motor to perform exactly the function desired by the operator. The pressure in the system is great or little according to the resistance offered to the cutting tool, but the feed motor moves at the rate of speed wanted by the operator without regard to the pressure which it must exert to do the work. If this pressure rises above the maximum required for feeding, a relief valve opens and the feed motor comes to a standstill, without damage. This function is made use of in locating shoulders, etc., in the work to be machined, as it is only necessary to set rigid stops and let the carriage run against them as desired.

The variable delivery pump described, installed in connection with a 20-ton hydraulic assembling press and driven by the standard Oilgear feed controller, gave a quick return speed to the ram of from 6 to 7 ft. per min., with a pressing speed of about 6 in. per min.

Coal Drying and Pulverizing Machine

A recent development of interest in the field of powdered coal apparatus is a self-contained machine recently brought out in England for the drying and pulverizing of coal, combining, it is said, the functions of the crusher or rolls, the dryer, the granulator, the pulverizer and the air separator. It is named the Atritor and manufactured by Alfred Herbert, Ltd., Coventry, England, and 50 Church Street, New York.

In England powdered coal is used principally for firing rotary cement kilns, and it is in that direction that the machine has been first applied. The makers

at 20 tons. Larger pumps would, of course, give more rapid ram traverse, suitable for production work. The press mentioned was used for general purpose work, mandrel pressing, straightening and broaching.

Variable Speed Drive for Spindles

A larger type of machine for driving the spindles of machine tools at any desired speed, from line shaft, constant-speed electric motor, or gasoline engine, has also been developed by the company. The unit shown in the accompanying illustration is of about 10 hp. capacity, and is for driving lathes, boring and milling machines, etc. The principle of operation is similar to that of the feed control system previously described, and secures for the operator an infinite number of speed changes in either direction through the manipulation of a single control handle. The speeds selected by the operator are obtained irrespective of changes in load. An automatic overload gear, adjustable to any desired maximum, prevents overloading the machine. When the maximum is exceeded the speed is reduced, stopping the tool entirely in case of a jam.

immediately without being given opportunity to absorb moisture. The volatile constituents pass into the kiln and are burned. The makers claim that the cost of operation in power and labor and the cost of maintenance is very small as compared with a plant of the usual type and that with the machine dust and dirt are entirely avoided.

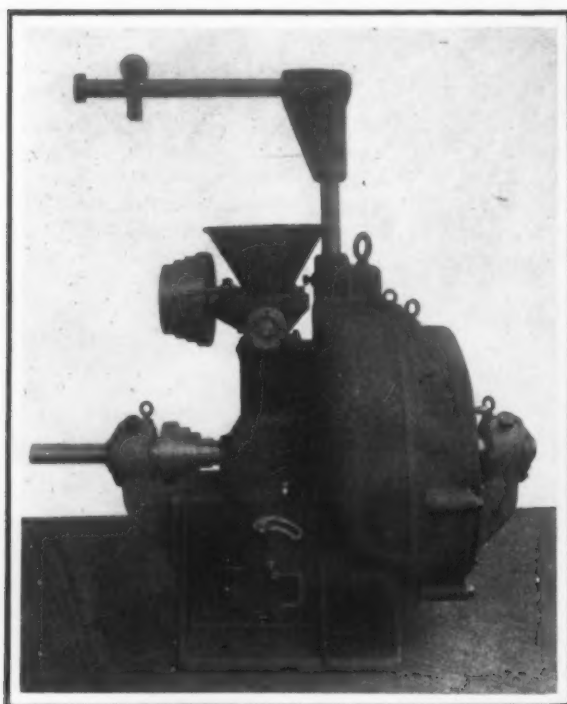
The machine consists of a cast-iron casing in which there is mounted a disk, dividing the casing into two parts. The disk is fixed on the shaft which is carried in the bearings to be seen in the illustration, and which revolves at high speed. Four concentric rings of studs are mounted on the disk, the internal faces of the casing having similar rings of studs arranged so that the disk studs in revolving intermesh with them, without touching. Mounted on the disk at its periphery, on the coal inlet side, there is a fan provided which draws air into the casing.

The hopper has a worm feeding gear driven from the main shaft through a cone pulley arranged to give four variations of feed. The raw coal, which is required to be in pieces of not more than 1 in. cube, is delivered from the hopper into an annular opening formed in the casing around the revolving shaft, and on entering impinges against the disk. Through the same opening the fan draws its supply of air, which in the case of a cement works using the machine was obtained from the cinder cooler at an incoming temperature of about 550 deg. Fahr.

The revolving disk throws the incoming coal outwards away from the shaft, and the path of the fuel is fanwise, and between the fixed rings of studs on the casing and the revolving studs on the disk. Under the influence of the current of air set up by the fan and assisted by a second similar fan on the revolving shaft inside the casing, the coal continues its progress through the machine, traveling inwards away from the inside periphery of the case, between the studs on side of the disk pointing away from the inlet and the studs fixed on the casing facing it. The path of the coal is U-shaped, first away from the shaft and then toward it, the latter direction being against centrifugal force. An arrangement shaped like a Sirocco fan but revolving backwards, prevents the passage of unpulverized lumps, throwing them back between the fixed and revolving studs, where they are broken up. It is claimed that any fineness or dryness of the coal may be obtained, even though the moisture content is as much as 20 per cent, which is greater than usually met in practice. The air, as well as conveying the fuel, acts also as an aid to combustion.

The floor space occupied is 6 ft. 6 in. by 3 ft. 8 in.

It was announced at Detroit Saturday that, effective immediately, the Highland Park plant of the Ford Motor Co. would operate on a five-day basis.



Raw Coal Is Fed into the Hopper at One End and Burnt in a Finely Divided State at the Other. The drying and pulverizing are simultaneous

claim, however, that it is equally adaptable to many other uses.

The raw coal is fed into the hopper at one end and burnt in a finely divided state at the other. The machine is driven by a single motor and requires no auxiliary fans, elevators or conveyors other than what is necessary to feed the raw coal into the hopper. It is said to be continuous in action and to dispense with storage bins for the pulverized coal. The drying and pulverizing go on together, the product being burnt

Expansion Prospects as Seen by Washington

Necessity of Greater Movement of Steel to Foreign Lands—Germany's Competition Not Causing Alarm—Markets of Other Countries

—BY L. W. MOFFETT—

WASHINGTON, Sept. 20.—Reports coming to Washington indicate that the American iron and steel industry is not disturbed as much as other industries in regard to German competition in foreign markets. The view generally taken by steel manufacturers is that Germany has hardly begun to approach anything like normal conditions and that she has far to go before they are reached. In addition to the matter of reparations to be paid over a long term of years, it is pointed out that Germany still faces liquidation and deflation and that activities of her manufacturers in selling in foreign markets are based on more or less artificial devices which sooner or later must give way to natural laws. When that time comes, Germany will have to meet a real test of sound competition. For the present, it is claimed that not enough is known of Germany's commercial processes and her future to establish a clear idea of what may be expected in the way of permanent competition. This is the position of Government officials whose work involves a study of export business, but they feel convinced that what Germany has done and is doing at present is largely a makeshift and low prices quoted on steel and other products, much below those of American and British manufacturers, either represent actual loss to German makers, despite the depreciated mark, and small wages, or the German Government is resorting to heavy subsidies, such as were pointed out some time ago by Secretary of Commerce Hoover. Neither of these conditions, it is claimed, can be maintained indefinitely.

Very Low Prices Named

Attention has been called to the fact that German steel makers and manufacturers of hardware have closed contracts in Latin-American countries at ridiculously low figures, sometimes as much as 50 or 60 per cent under quotations of competitors, a situation which, it is held, cannot possibly accord with sound economics and financing. That this is evident is indicated by the fact that the German makers have been compelled in some instances to abandon their contracts, although it is rather puzzling as to the motive behind the German manufacturers in closing the contracts, unless it is that they hope to gain time in an effort to recover their position by disturbing the markets for manufacturers of America and other competing countries. The lower prices of German makers, it has been stated, may be partially, but far from entirely, explained by the fact that the quality of their products often is greatly below their pre-war standard. In this connection, Government officials are pleased with reports coming from American commercial attachés, consuls and trade commissioners showing that the American steel makers are paying the strictest regard to quality and, moreover, are establishing stronger foreign business relations by extending more liberal credit terms and meeting satisfactorily shipping requirements, such as those relating to packing, delivery, etc. At the same time, the opinion has been expressed that too much attention has been paid to price and that it will be necessary to make some sacrifices in this direction if future competition is to be met thoroughly. It is noted, however, that, as a general thing, American makers are offering tonnage at more attractive prices than British makers are, but

this also, it is claimed, is a condition of the present and one that may not obtain long unless American producers stand ready to meet more sharply competitive conditions in the future when the world's purchasing power has recuperated.

Necessity of Expansion

While market conditions of the future are an unknown quantity, American steel manufacturers are thoroughly aware of the necessity of going into the world's markets as never before if they are to maintain satisfactory operations now that capacity has been expanded to such a degree as that which has been built up. Exports of steel tonnage sold during recent years by American producers have averaged approximately 10 per cent of their output. But, as pointed out to the Senate Committee on Finance by Chairman John A. Topping of the Republic Iron & Steel Co., in the course of hearings on the tariff, when he spoke for independent makers, it now is considered necessary to export 20 per cent of the present capacity, in view of home conditions. Roughly, according to Government officials, this will mean the exporting of not less than 7,500,000 tons of rolled steel annually. An idea of what this will involve in the way of building up foreign markets can be gained from a study of past exports. The largest export movement of iron and steel products from the United States was 4,820,216 tons, or about 65 per cent of the tonnage which would have to be exported if 20 per cent of the capacity is to go to foreign market. This shipment was made in 1920, under unusually favorable conditions from the American viewpoint because of the absence of measurably active competition from other steelmaking countries. The heaviest pre-war exports of iron and steel from the United States were made in 1912 with a total of 2,947,597 tons, 1913 ranking a close second with 2,760,133 tons.

Ante-bellum Exports

Further emphasizing the statement that the American industry will be compelled to be active in developing foreign markets if the 20 per cent of capacity is to be shipped abroad is the fact that the largest export movement of iron and steel from all important producing countries prior to the war, including the United States, the United Kingdom, Germany, France and Belgium, totaled approximately 14,500,000 tons, which moved in 1913. This is about 50 per cent of the above conservative estimate of what 20 per cent of the American rolled output will be.

The belief prevails that the American makers will have to concentrate largely on the markets of the orient, Latin-America and British dominions, and maintain their position in the markets of Canada, the largest of all consumers of American steel aside from the United States itself. While, of course, exports will go to continental Europe, doubt is expressed that it will be possible to meet competition in those markets from makers in European countries under normal conditions, except to a limited extent, as in the past. It also is a question as to how much expansion may be brought about in British dominions, except Canada, because of the more favorable tariffs prevailing and under consideration, for English makers. The proposed bar-

gaining tariff in the Fordney bill is expected to be only a partial offset of this situation.

Not Yet Threatened

Simultaneously with the study to develop foreign markets, the American steel makers, as they have indicated to Congress, want fair protection from foreign competition in the domestic market and it is generally conceded that they have asked only moderate protection. It is stated that, despite infrequent flurries of alarm, the domestic market has not been threatened since the war by foreign producers. Any apprehension that German makers would invade it extensively has proved unfounded so far. It is shown, for instance, that during the first seven months of the present year, only 440 tons of steel, chiefly bars, sheets and plates, have been exported to the United States from Germany and that the total imports from all countries for that period amounted to only 37,500 tons.

Restoration of normal conditions obviously may bring about an entirely new situation and one that will threaten American makers both in the export and domestic markets and it is largely because of this that a proper tariff against imports is sought and plans are being made to expand foreign markets. But it is doubted whether Germany will be a strong factor for a long period or ever will regain her past position,

when she exported steel in much greater quantities than any other country, her exports in 1913 averaging 479,800 tons a month, or 5,757,600 tons for the year. At the same time, the potential power of Germany, when she recovers, is not being overlooked. The war has stripped that nation of some of its power to the advantage of France, which now is receiving attention as a probably more active competitor of the future. It is estimated that France now has a steelmaking capacity of 8,000,000 tons annually, of which 2,000,000 tons or 25 per cent will be in excess of home demands and therefore will be available for export. Exports of steel by French makers in 1920 were approximately 50 per cent greater than in 1913, averaging 77,750 tons monthly for the eight months of the former year.

When the situation is summarized, it is considered that the American industry is about to enter upon broader expansion than ever before, though it will be compelled to meet obstacles and sharp competition. It is with this view in mind, as it relates to American industries generally, that Government agencies, such as the new commodities divisions of the Bureau of Foreign and Domestic Commerce, are studying foreign markets as much as they can be studied under present circumstances, and are doing their best to keep American trade informed of those vital facts that will be helpful.

MORE ACTIVE MILLS

Operations in Mahoning and Shenango Valleys Are Improved

YOUNGSTOWN, OHIO, Sept. 20.—Following attempts to stabilize the steel market, operations in the Mahoning and Shenango Valleys are considerably improved this week, as indicated by the fact that 70 of 105 sheet mills are under power. The maximum of sheet mill capacity which has been engaged has been 40 to 45 per cent for many weeks. The development is held to reflect the recent price advances in sheets.

Of the 66 open-hearth furnaces in the district, 37 are charged, including 25 of the 51 independent units. Two of the three Bessemer departments are active, while steel output approximates 60 per cent, as compared with recent averages of 50 per cent. Tinplate and wire product departments also expanded their activities this week.

Current sheet mill schedules are: Brier Hill Steel Co., 16 mills; Republic Iron & Steel Co., 7; Youngstown Sheet & Tube Co., 14; Trumbull Steel Co., 12; Newton Steel Co., 10; Sharon Steel Hoop Co., 7; Falcon Steel Co., 5.

Operation of Mattie blast furnace at Girard of the A. M. Byers Co., Pittsburgh, may be started around Oct. 1, while it is currently reported that the Trumbull-Cliffs Furnace Co. is preparing to blow in its new stack about the same time, to supply hot metal to its open-hearth furnaces. The Byers company is operating 22 puddle furnaces and one skelp mill at its Girard works.

Trumbull Steel Co. has 16 tin plate mills on the active list this week. Seven of the Valley's 17 tube mills are rolling, four being operated by the Sheet & Tube company and three by the Republic company. Rod, wire and conduit production is sustained at 50 per cent.

Steel fabricators are enjoying a much better business, as indicated by the operation of its road mesh and hyrib departments night and day by the Truscon Steel Co. Officials report that August bookings were 100 per cent greater than those in April and that aggregate schedules are holding up between 65 and 70 per cent.

District units of the Carnegie Steel Co. are operating on a larger basis, supplying tonnage to other Carnegie company plants. Demand for sheet and tin bar has been such as to accelerate operations in affected departments. Three of the company's six blast furnaces in the Ohio Works group are pouring and

additional stacks are likely to be blown in before the end of the month.

In the Shenango Valley, the most noticeable increase in operations has been in subsidiaries of the Steel Corporation, the American Sheet & Tin Plate Co. and the American Steel & Wire Co. The former is operating 20 tin mills and its full complement of sheets units, while the nail department of the latter at Farrell, Pa., is operating at capacity. The Valley Mould & Iron Corporation plant is on a 50 per cent basis.

Only one of 14 blast furnaces in the Shenango Valley is pouring, No. 3 stack of the Shenango Furnace Co.

Plant Operation

Ten of the 20 hot mills of the New Castle, Pa., works of American Sheet & Tin Plate Co. will resume operations Sept. 26. Old Meadows works of this company at Scottdale, Pa., a plant of 8 hot black sheet mills, started up Sept. 19, after having been down since about the middle of last April.

During the first week of September the Hendee Mfg. Co., Springfield, Mass., motorcycles, received orders for 700 machines. Working forces at the company's plant will immediately be increased.

The Chicago Railway Equipment Co., Chicago, will pay a 2 per cent dividend on Oct. 1, to all stockholders of record. This payment will be unusual in that it will be the one hundredth consecutive quarterly dividend of the company. The chief products of the company are brake beams and bolsters for railroad cars, steel transmission poles, reinforcing steel, and all kinds of malleable castings. Its subsidiary plants include the Franklin Steel Works, the Marion Malleable Iron Works, the Grand Rapids Malleable Works, and the Detroit Forge Plant.

The industrial situation at Anderson, Ind., has improved, with the reopening of the rod mill of the American Steel & Wire Co. The wire mill continues in operation. The Ames Shovel & Tool Works and the Anderson Foundry & Machine Co. have resumed operation.

Out of a total of 21 plants, chosen at random from the major industries of Terre Haute, Ind., two are reported operating at 100 per cent capacity, 14 at around 75 per cent of normal, four show no increase in business and one is idle, with no definite plan for resumption.

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How Much Work Is Being Done?

There is a difference between business being "good" and its being "active." There may be heavy operations without much profit, and indeed there may be a loss. The terms are not interchangeable, just as it has been found by painful experiences of the individual that earnings and prosperity are not the same thing. Many men had large incomes in 1920 and did not prosper or advance.

As many lines of business are not particularly profitable at this time it is of interest to inquire how much work the country is doing, to see whether the lack of profits is attributable to inactivity in general or to something else. Statistical information of the greatest weight indicates that much work is being done.

Debits to individual accounts at banks are reported by the Federal Reserve Board as indicators of the volume of the nation's business. Figures for recent periods make the following showing, in millions of dollars, while the lag or decrease from the figures for the corresponding periods in 1920 is given:

Bank Debits, Millions of Dollars		
Four Weeks Ended	Amount	Lag
May 25.....	\$30,852	17 per cent
June 22.....	30,651	15 per cent
July 20.....	29,174	19 per cent
Sept. 7.....	25,551	20 per cent

In considering the average lag of 18 per cent one must remember that there have been large decreases in dividend payments and large reductions in salaries and wages, while commodity prices have so declined that the same money transfer represents a much greater quantity of merchandise. One can hardly avoid the suggestion that the quantity of business done has increased, when the total of transfers of money has decreased only 18 per cent.

Another indicator to be considered is employment and unemployment. The latest figure for the number of names dropped from payrolls is 5,735,000. That is about one-eighth of the total number gainfully employed during the fore part of 1920. We have heard so much of increased output with decreased personnel that we cannot avoid concluding that if seven-eighths were on full time they would be doing much more work than were the eight-eighths last year. Of those not out of em-

ployment many are on short time. There is no indication, however, that there has been a great decrease in the quantity of work, of all descriptions, being done.

A third indicator is the freight movement on the railroads. The June report showed 28,141 million net ton-miles of revenue and non-revenue freight movement, which is 20 per cent more than the average movement in the five years ended June 30, 1914, while it is only 31 per cent below the rate in the best single month on record—August, 1920. The ton-mileage of last June was accomplished with little help from ore and coal movement. If it be said that the movement was largely of road-building and therefore of unimportant material, it is to be noted that a made road does not average over 10,000 tons per mile in weight, while the material is not transported an average of 100 miles, so that there is much less than one million ton-miles of freight per mile of road built, while the June freight movement was 28,141 million.

The country has really been doing a great deal of work in the past few months. One hears much of the inactive lines and little of the active lines. The inactive lines, therefore, may be expected to pick up. There is some abnormality in the situation now, but not as much as there was in 1920, with prices and wages abnormally high and service rendered abnormally low.

The Unemployment Conference

Sharp differences of opinion as to the best methods of conducting the unemployment conference at Washington are likely to develop. Naturally there is a desire to rule out subjects upon which the conferees are likely to disagree, and every one who wishes to see the conference succeed will hope that serious disagreement may be avoided without ignoring fundamental principles which must govern in arriving at wise conclusions.

On one point there can hardly fail to be general agreement—that is, that there should be no division, nominally or actually, into groups representing different classes of people. President Harding has taken a decided stand against any such classification of members of the conference, and Secretary Hoover will act in harmony with the President, thus

avoiding the rock on which the first industrial conference of the Wilson administration split.

Although the conference was not the subject of consideration when General Pershing spoke at the recent dinner in Washington celebrating Lafayette-Marne day, a sentence in that address may well be remembered in connection with the approaching meeting. "The policies of this republic are not determined by labor unions or by any other organizations, but by the consensus of opinion of its patriotic citizens of whatever affiliations."

The members of the conference are confronted by the difficult problem of reducing unemployment in accordance with sound economic principles. If they enter upon their task without regard to what any group of citizens may selfishly advocate, they will take an important step in the right direction.

One of the principles which cannot be ignored is that, in a period of readjustment such as the world is now passing through, labor cost must be reduced in harmony with other costs, and any effort, whether organized or not, to prevent an equitable reduction is a cause of unemployment and will retard the return of prosperity. Thousands have already joined the army of the unemployed because they were not willing to accept reasonable reductions or were not permitted by labor unions to do so, and there is grave danger that many thousands on railroads and in plants may be forced into idleness on account of radical leadership. At the same time, employers have great responsibilities. Most of them have shown a keen appreciation of that fact by giving employment to as many men as possible and by reducing wages only when and to the extent imperatively necessary; but some have not always realized that the loss of a job means much more to the employee than the loss of dividends to the employer.

The Washington conference may be able to accomplish much in bringing about better distribution of work and encouraging public improvements. But all of this would be in the nature of palliatives. A more important achievement, even though not so noticeable in direct effects, will be secured by impressing upon all employers and employees the vast importance of the part they must take in the reconstruction of a troubled world. Never before was there such great need for unselfish and enlightened co-operation.

Elihu Root, in a recent address, said that "it is not what a nation does for itself, but what it does for humanity, that makes it great." It is equally true that the greatness of an industry is not measured merely by the money it makes, but also by the service it renders its employees and the public, by contributing to the well being of those who are employed and by winning the respect and good will of all the people.

A comparison of the world demand for steel in 1920 with that of 1913 is now possible. The statistics of the five leading producing countries—the United States, Great Britain, France, Belgium and Germany—show iron and steel exports last year of 11,499,500 tons, as against 15,737,400 tons in 1913. This decrease of about 27 per cent is in the face of extravagant predictions of a heavy worldwide demand as a result of the war. Yet in the light

of post-war developments the showing is excellent. Of particular interest, apart from the fact that the United States and Great Britain changed places last year, the former being the largest exporter in 1920, whereas Great Britain was well ahead in 1913, France exceeded her 1913 exports last year by 54.7 per cent, while 63 per cent was the increase in the case of the United States. Germany's iron and steel exports in 1920 were about 30 per cent of those in 1913, while Belgium's recovery from the effects of the war is measured by exports last year that were 56 per cent of those for 1913.

Stainless Iron

A new alloy steel has appeared in England concerning which some important predictions are being made. It has been called stainless iron, "for want of a better name," and is a direct derivative of the now famous stainless steel, also a British invention.

Stainless iron is really stainless steel with a carbon content of about 0.10 per cent or less. Three British firms are making it and it is a product of the electric furnace. So far as known it has not yet been made or exploited in this country. This new low carbon chrome-iron alloy is distinctly softer than stainless steel and is thus suited to various manipulative operations. Because of its malleability it is offered for a wider range of uses in forging, pressing and stamping than stainless steel, which is admittedly hard to handle and difficult of heat treatment. Already success is reported in producing automobile wheel disks, hoods, bodies, and other products subject to corrosion or tarnishing, thus eliminating painting and varnishing. It is claimed that it will modify industry in the future so far as light metals are concerned; also that, while it is more expensive than brass, it is easier to keep clean. In fact, the pioneers in rustless iron are confident that its possibilities are well nigh unlimited.

The new alloy is expensive, because carbon-free ferrochromium is essential in its manufacture. Its discovery is a striking example of the possibilities of only a slight modification of present simple or complex alloys. The mere lowering of the carbon transforms an alloy heretofore found difficult to handle, into a radically different product. Similar changes in the composition of other alloy steels now in use are being studied and give promise of equally valuable and interesting results.

American Tin Plate Preferred

Before the war Japan was a large buyer of Welsh tin plates. In 1913 that country purchased 5.7 per cent of the total British exports. In 1920 this proportion was only 2.8 per cent, or a decline of about 50 per cent. In 1913 Japan purchased an insignificant proportion of the American tin plate output. During the war that country was forced to obtain its supply from American makers. The interesting fact is that this practice has continued, Japan having bought in 1920 as well as in 1919 about 22 per cent of the total American tin plate exports.

These facts have not been overlooked in Great Britain. Inquiries were made through diplomatic

channels and the commercial counsellor to the British Embassy at Tokio reports as follows:

1. Japanese buyers were forced to take American tin plate during the war, and having become accustomed to it are not disposed to change.
2. The conditions encountered by buyers of British tin plate when it once more became available were not such as to dispose them to prefer it to American. Prices were subject to surcharges for increases in cost of labor and materials, and shipping clauses were also uncertain. These conditions were of course due to labor and economic difficulties in England.
3. Tin plate which did arrive from England was not of the high quality to which buyers were accustomed before the war; while American tin plates have improved in quality since the war, and American manufacturers pay special attention to the adaptation of their product to the requirements of the Japanese market. It is understood, for instance, that for the manufacture of tins for kerosene and foodstuffs by automatic machinery, they are ready to give soft, tough material for ends and stiff material for bodies, to cut the plate so that the grain runs as the buyer desires, etc.
4. There are more suppliers of English tin plates than of American and therefore greater variations in quality.

Of special significance are the statements that Welsh tin plates have not been of the quality to which buyers were formerly accustomed and that the American product has improved in quality since the war. It is to be noted, moreover, that American makers pay special attention to the adaptation of their product to the needs of the Japanese. Commonly heretofore, American exporters have been reproached for their failure to have their products meet the preferences of foreign buyers.

These facts furnish an impressive example of what can be done by American producers of other steel products needed by foreign buyers. Although Welsh tin plate is available at a lower price than American, the latter has been able to hold its Japanese trade due to the reasons mentioned. Superior quality, due partly to larger unit production, and adaptation to the buyers' needs are cardinal points in the holding as well as the expansion of the steel export trade of the United States.

"Contract" Buying of Steel

It is a question whether the practice in vogue in the finished steel trade for many years, that of making "contracts," will be revived. It has been largely disrupted in recent years. There was the Government control of the trade during the war, which practically shelved contracts, and then there was the period of price strain in 1920, when the independent producers were indisposed to accept contracts while the Steel Corporation designated to each customer the amount of contract tonnage it would accept.

Apart from these influences tending to break the trade of its habit, there has been some general disposition on the part of producers to get away from the practice, particularly in the case of annual contracts. Until a few years ago, for instance, it was the practice in the tin plate trade to make contracts for a whole calendar year. Many of the tin plate consumers insisted it was necessary for their safety that they be "protected" by a contract for the whole year. The producers claimed otherwise, and eventually effected what they considered a signal reform. The agricultural im-

plement trade likewise felt that it needed "protection" for its "season," and in many years contracts were made in April or a little later for a manufacturing season that was not to begin until the following August. That practice, also, was modified more or less.

The contract system in the sale of finished steel products has been the subject of much criticism. With considerable justice the usual contract was dubbed "jug-handled" or "option" or "accordion," because of the flexibility in interpretation as to the quantity of steel actually shipped under it. All the arguments against this system of doing business were logical, and they were more or less convincing except for one that ran the other way, the argument that whatever might be said against the system the practical showing was that both the steel producers and their customers had been quite successful in a business way while doing business after this style year after year.

The vitality of the contract system lay in the fears entertained by both producers and consumers, producers fearing that they might not have orders, consumers fearing that they might not be supplied with steel. When business prospects were fairly good the producers oversold and the consumers overbought. If business turned out to be good the mills fell behind in deliveries and were unable to realize on price advances as soon as circumstances really justified. If business proved poorer than expected the sellers had opportunity to make concessions quietly to their customers, to induce specifying, and the market was less disturbed than if the consumers had hawked their specifications throughout the trade.

There was one evil of the contract system that did not receive as much criticism as it deserved, and that was the evil of the steel market being made to appear stronger than it really was. When conditions were improving, there was what was called "forward buying" and the trade got more or less into the habit of confusing cause and effect. There was forward buying, and then actual tonnage demand upon the mills increased. It was not the contracting that produced the improvement in deliveries and consumption, but rather it was the prospect of improvement that had brought about the so-called "forward buying." The point is illustrated by the fact that in the past few weeks there has been comment in some quarters to the effect that the steel market was in poor condition, because there was no "forward buying." The producers regarded such references as a grim joke, for what they wanted was an immediate operation, not an uncertain prospect of an operation in future.

As conditions stand now, steel consumers may change from a policy of strictly hand to mouth buying to a policy of buying for short periods ahead. It will be interesting to observe signs that the period is to lengthen.

Work has been resumed in five of the Colorado Fuel & Iron Co.'s mines in Las Animas County, Colo. These mines were closed recently following a walkout of the men as a protest against a reduction in wages. About one-third of the strikers returned. The company charges that the men are being intimidated, but no disorders have been reported.

CORRESPONDENCE

Against a Duty on Ferromanganese

To the Editor: The brief as submitted by John J. Howard, general manager of the Lavino Furnace Co., Philadelphia, arguing for a duty on ferromanganese, as published by your valued paper of Sept. 8, has just been brought to the writer's attention, and I feel sure as a leading publication of the iron and steel trade that you will grant the writer a small space in order that he may show a few of the inaccuracies published in this brief.

Mr. Howard advises that he is representing the following companies:

Lavino Furnace Co.
E. E. Marshall
American Manganese Mfg. Co.
Southern Manganese Co., electric furnaces at Anniston, Ala.

It may be well to know that Mr. Marshall and the American Manganese Mfg. Co., as far as all practical purposes are concerned, as to selling are one and the same thing. The Southern Manganese Co., having electric furnaces, or making ferro by the electric process, is not a factor in commercial ferromanganese. The Lavino Furnace Co. and Mr. Marshall have acted in the past as practically one in making a price on ferromanganese, and where it has been possible to maintain prices they have acted in entire accord with one another.

Mr. Howard makes the immediate claim in his brief that ferromanganese should not be classed with pig iron or other semi-raw products, but as a "finished product." The writer really feels that there can be no possible argument as to an error in this statement. Ferromanganese is just as much a semi-raw material as pig iron, ferrosilicon or other products made direct from the ore. The best comparison as to the use of ferromanganese is that it is "the salt to the cook." No steel can be made without the use of ferromanganese for the purpose of deoxidizing or cleaning the semi-finished product. In making steel it is just as necessary as salt to the palate.

When he speaks of the necessity of having a ferromanganese industry in this country he must realize that up to the year 1914 all the steel works, with the exception of the United States Steel Corporation, and at times the Cambria and Bethlehem steel companies, purchased their ferromanganese where they could buy it cheapest, the above named concerns making ferromanganese for their own uses when they felt the necessity of so doing. The ore supplies at all times for any ferromanganese made in this country have come from foreign countries, principally Russia, India and Brazil, and as Mr. Howard rightly argues it would be useless hardship not only to the steel works but the producing companies to place a duty on manganese ore, as there is not sufficient manganese ore available within ordinary railroad transportation limits to induce the mining thereof. In fact, during the war, when every available part of this country was searched there was so little high grade ore discovered and that in such distant parts, that it would not be a factor in producing standard 78 to 80 per cent ferromanganese in this country.

Mr. Howard goes on further to state that in order to protect this new found industry the makers of ferromanganese should have a 25 per cent ad valorem duty based on American values. They require this duty not for the purpose of protecting the ore miners but for the sole and absolute purpose of making sufficient profit in the making of ferromanganese to keep this infant industry on its legs and at the expense of every user of ferromanganese in this country. He continues:

The unfair methods practised by the foreign producers in the past lead us to conclude that only an exorbitant specific duty would afford the American industry adequate protection. It is for this reason that we should have an adequate ad valorem duty, with the added advantages of the American valuation plan to meet the situation.

As the result of pernicious propaganda on the part of the American agents of the English ferromanganese producers the question has arisen why, when former tariff bills did not carry a higher duty than \$4 a ton, it should now be necessary to impose a duty that would protect the manufacture of ferromanganese.

And again he states:

The dominating factor of the foreign producers is the British pool, whose avowed purpose is to reclaim the American trade and to drive the American maker out of business by unfair competition.

This unfair competition has already been brought to the attention of the United States Government and is in process of investigation by the Federal Trade Commission.

Since Mr. Howard has filed this statement the trial examiner of the Federal Trade Commission has submitted the proposed finding as to the facts and conclusions before the Federal Trade Commission. This has been filed after many hearings and much testimony has been taken, with the following results, and the writer quotes as follows from this finding, page 11, article 19:

There was no collusion between the English principals of the respondents and none on the part of respondents to fix prices. Each was in active competition with the other and incidentally they were all in competition with such American producers as had ferromanganese to sell; the efforts of the English producers were solely directed to the sale of their own product; but at the same time they were anxious to obtain the highest price possible and were reluctant to reduce the selling price.

And again on page 13, articles 22 and 23, the following are the concluding sentences:

There is not a scintilla of evidence that respondents or their principals commonly or systematically imported and sold ferromanganese in the United States at prices substantially less than the actual market value of ferromanganese in England.

There is evidence that the importing and selling of ferromanganese by the respondents or their principals into the United States was done with any intent to injure the industry of manufacturing ferromanganese in the United States, and there are no facts and circumstances proven from which such intent can logically or legally be inferred.

With such a distinct and absolute finding, there can be no doubt that all questions such as raised by Mr. Howard in regard to pool operations have been proved untrue.

In Mr. Howard's quotation from the *London Iron and Coal Trades Review* of Aug. 12, page 224, he has omitted the most important part of the quotation, which the writer will give herewith below, exact wording as published in this paper of the date referred to by Mr. Howard:

Ferromanganese:		f	s	d
76 to 80 per cent, loose.....		18	0	0
76 to 80 per cent, export.....		14	10	0
76 to 80 per cent, packed.....		19	0	0
American, 80 per cent d/d.....		\$70.00		

Mr. Howard might not have been aware of the fact that "for export-English" means distinctly Japan, Australia, China or other countries outside of America. The American quotation is distinctly \$70 d/d, or in other words \$70 f.o.b. seaboard in this country. As recently as date of Aug. 12, the American price of ferromanganese was \$65 to \$68. Again, Mr. Howard, while giving the production of ferromanganese through the war period, neglects at the same time to give the prices of ferromanganese not only during this period but during the period of five years before the war. The writer furnishes herewith quotations as given in Metal Statistics for the period of 1909 to 1920:

	Aver.		Aver.
1909.....	\$42.73	*1915.....	\$92.21
1910.....	40.49	*1916.....	164.12
1911.....	37.25	1917.....	309.17
*1912.....	50.40	1918.....	245.83
*1913.....	57.87	1919.....	132.16
*1914.....	55.80	*1920.....	172.33

*Contract Prices Tariff Off. Oct. 4, 1913, \$2.50.

The above merely gives the average for each year during this period, but if any one desires to consult the Metal Statistics he can obtain the prices month by month. It will, of course, be noted what prices were obtained by the American producers during the war period or when English ferromanganese was not available. It might have been of considerable interest to the readers of Mr. Howard's argument to note the profits of the American producers during the periods

in question. Mr. Howard has stated that the steel interests, as evidenced in their testimony, were not opposed to a duty on ferromanganese. The writer does not know what part of this testimony Mr. Howard refers to or to what extent the steel interests he refers to might agree to a duty placed on ferromanganese, but the writer has before him numberless letters protesting against this duty on ferromanganese as being purely a fraternal one for the benefit of practically one or possibly two interests, to which every maker of steel in this country will pay his toll.

There is no question at the present time that we are in a most extremely difficult position as to our export business. With Germany, France and England making a most strenuous effort to corral the business which we are most eager for and which is absolutely necessary for our steel works to have, it does seem to be poor policy to saddle every one of the makers with the extra cost of the added duty for the benefit of such a few as are now asking for this. Of all the products which should come in free to this country it is conceded that there is a greater argument for ferromanganese coming in here at the cheapest possible price than possibly any other semi-finished material, for the simple reason that there are practically no ores that can make this product here.

If a high duty should be levied it would make just so much additional cost to every buyer of ferromanganese and every steel works in this country, even to those works that produce their own ferromanganese, as the added demand for manganese ore would be such that the price of this mineral would be greatly enhanced by the very great increase in the demand made here. If a duty were placed, it would be so purely for the sake of protection and benefaction, and not for revenue, and we believe it would be strongly against the feelings of the greater part of the Republican party.

FRANK SAMUEL.

Philadelphia, Sept. 16, 1921.

Embrittling Effect of Pickling Upon Carbon Steel

To the Editor: In an interesting article on page 334 (Aug. 11), Mr. C. J. Morrison claims that the perplexing problem of acid-brittleness in steel sheets and wire has at last been solved by the aid of the microscope. May I not, with all due respect to Messrs. Morrison and Zanzinger and to the art of metallography, advance a claim in behalf of the pioneers who, at least 50 or 60 years ago, following the general introduction of sulphuric acid as a pickling agent for wire rods, worked out the practice of baking rods and wire to remove acid-brittleness. It seems only just to admit that *they solved the problem* while our generation at most has been able to show the mechanism through which acid produces and heat subsequently removes the condition noted.

Even for the credit of this lesser achievement the chemist has a claim prior to that of the metallographist. It has been common knowledge in the wire trade for the past 10 to 15 years that acid-brittleness is accompanied by, and presumably the result of, the presence of hydrogen in solid solution in the steel, and that upon baking the steel at low temperatures, hydrogen is evolved and brittleness disappears. It is a well established fact that when hydrogen is generated as the result of an attack upon steel by the common mineral acids in hot dilute solution, a portion of the hydrogen is absorbed by the steel through the process of "occlusion" and the steel coincidentally becomes hard on the surface and brittle. It is susceptible of proof in the laboratory that such steel upon heating gives off liberal quantities of hydrogen and regains its original physical properties. The degree of dehydrogenation is a function of time as well as temperature. A short exposure to 500 deg. is no more effective than a longer exposure to 200 deg. and it is even possible to restore toughness to pickled wire by leaving it on the mill floor for two or three weeks with no other treatment. The subject has been sufficiently studied to convince the persons interested that the relation between occluded hydrogen and acid-brittleness is that of cause and effect.

Can Mr. Morrison say as much of the metallographical phenomena described in his article? It would seem to the writer that Mr. Morrison has said either too much or too little. The junction lines between grains are presumably nothing but geometrical lines, indicating planes of contact. They are naturally the first points of attack by acid. If they are actually widened by the action of acid, and this is not merely a surface phenomenon, comparable to the deep etching of a specimen, the result of such widening would presumably be not the embrittling of the steel but its complete disintegration.

I am not prepared to accept Mr. Morrison's conclusion that "brittleness is due to the increase in width of the junction line," nor, without further evidence, to believe that the increased width of the junction lines, except upon the surface, is regularly associated with acid-brittleness. If the widening exists as a surface phenomenon it is easily explained. If it persists throughout the steel it has not been explained at all.

KENNETH B. LEWIS,

Worcester, Mass., Aug. 24.

Manager of Sales,
Morgan Construction Co.

Universal Steel Classification Code

To the Editor: I have read with a great deal of interest the article in THE IRON AGE of Sept. 1, by Messrs. Knerr and Collins, entitled "Universal Steel Classification Code." After a careful study of the matter I believe their proposed system is superior to that of the S. A. E. and I wish to add my indorsement to their plan.

Under the present system of research and investigation new alloying elements of great importance are being discovered every day. A few years ago these elements were regarded as rare metals of insignificant importance. Several good examples of these are titanium, uranium, zirconium, molybdenum, all now finding their way into commercial steels. Who knows at what date some of the other rare elements may come to the front? If this were to happen it would require another revision of the S. A. E. code. Having now 14 elements of alloying importance, with only nine numerals to handle them, where and how would we be able to take care of six or seven more, without extending classification numerals indefinitely? Under the proposed method this is a very easy thing to do, having 24 possible letters, giving a large margin for the future without any change of the basic arrangement.

Take some of the following steels, for instance: Manganese, 18 to 20 per cent; nickel, 3.25 to 3.75 per cent; silicon, 0.40 to 0.60 per cent; carbon, 1.80 to 2.00 per cent; manganese, 14 to 17 per cent; nickel, 3.50 to 4.50 per cent; chromium, 1.00 to 2.00 per cent; silicon, 0.70 to 0.80 per cent; carbon, 1.40 to 1.70 per cent; manganese, 11.00 to 13.00 per cent; chromium, 0.40 to 0.70 per cent; silicon, 0.55 to 0.65 per cent; carbon, 1.10 to 1.30 per cent; manganese, 11 to 13 per cent; copper, 1.25 to 1.90 per cent; silicon, 0.40 to 0.60 per cent; carbon, 1.10 to 1.30 per cent. Then take the steels of the high nickel series; steels such as were used for helmets and rifle-proof armor during war time, containing carbon, 0.37 to 0.47 per cent; manganese, 0.95 to 1.05 per cent; nickel, 1.90 to 2.10 per cent; silicon, 0.15 to 0.25 per cent, and vanadium, 0.15 to 0.25 per cent. While these are all special or "X" steels, the proposed code gives a very simple way of showing their exact classification by means of letters. This would be a very difficult matter to accomplish by means of the numeral system.

The standardization of the alloy steels is a matter of great importance to both the manufacturer and the purchaser and a good system of classification would help greatly to promote a better understanding of the situation. The ability of the electric furnace to furnish high temperatures and the quality of product it makes possible will, I believe, bring many more elements before the steel world which heretofore have been considered of no practical value.

LARRY J. BARTON,
Metallurgist.

Southern Pacific Lines, Sacramento, Cal.
Sept. 8.

WORLD FOUNDRY EXHIBIT

To Be Held in 1922 by British Foundrymen at Birmingham, England

In connection with the annual convention of the Institution of British Foundrymen in 1922 it is proposed to hold an international exhibition of foundry equipment and materials during the convention week, at Birmingham, England. The exhibition will be open from June 15 to June 24 and will comprise exhibits from the United States, France, Belgium and England, embracing every phase of foundry work. It is the first exhibition of this nature held in England and an influential council has been appointed to make it a success.

Invitations to attend have been sent to the American Foundrymen's Association and papers will be contributed from this association as well as from the French and Belgian associations. The exhibition will include appliances and materials in connection with ferrous and non-ferrous foundry trades. English foundrymen are looking forward to seeing modern American foundry equipment and it is expected that the American manufacturers will take advantage of the opportunity.

The exhibition will be held in the large Bingley Hall, which is well adapted for the purpose, every convenience being provided for exhibiting plant in motion. As a large portion of the space has been applied for, it is necessary that American exhibitors send in their applications without delay, addressing them to the Secretary of the Chamber of Commerce, Birmingham, England.

Pittsburgh Foundrymen's Association Elects Officers

The first monthly meeting of the 1921-1922 season of the Pittsburgh Foundrymen's Association, held at the General Forbes Hotel, Monday evening, Sept. 19, was featured by the presentation of "The Story of Ingot Iron," a three-reel film prepared by the United States Bureau of Mines at the plant of the American Rolling Mill Co., Middletown, Ohio.

Appropriate resolutions were adopted for the late Bayard Phillips, secretary of the association for a number of years, who died Aug. 30.

E. D. Frohman, Pittsburgh district sales manager S. Obermayer Co., who attended the international convention of Rotary Clubs in Scotland last summer, and Samuel Sleeth, retired superintendent of the foundry of the Westinghouse Airbrake Co., Wilmerding, Pa., who made a trip last summer, recounted their European experiences.

Officers of the association and the committees for the ensuing year follow:

President, F. H. Clay, Allegheny Steel Co.; vice-president, Samuel B. Cuthbert, Carnegie Steel Co., Braddock, Pa.; secretary and treasurer, William J. Brant.

Executive Committee.—A. J. Hartman, United Engineering & Foundry Co.; John Field, Union Steel Casting Co.; John W. Guay, Fort Pitt Steel Casting Co.; Thomas A. Wilson, Rogers, Brown & Co.; W. B. Robinson, THE IRON AGE.

Foundry Fund Trustees.—William J. Brant; J. Lloyd Uhler, Union Steel Casting Co.; Charles H. Gale, Pressed Steel Car Co., McKees Rocks, Pa.

Program Committee.—W. B. Robinson, chairman, THE IRON AGE; George F. Tegan, THE IRON AGE; L. B. Snow, Hickman, Williams & Co.; William K. Frank, Damascus Bronze Co.; E. D. Frohman, S. Obermayer & Co.

Membership Committee.—John W. Guay, chairman, Fort Pitt Steel Casting Co.; McKeesport, Pa.; Thomas A. Reynolds, McConway & Torley Co.; H. M. Meixner, Hempfield Foundry; Harry Petty, American Steel Foundry Co.; J. S. McCormick, J. S. McCormick Co.; Gustav A. Bauman, Jones & Laughlin Steel Co.

Social Committee.—A. J. Hartman, chairman, United Engineering & Foundry Co.; L. A. Way, Duquesne Steel Foundry Co., Coraopolis, Pa.; H. P. Spilker, Sterritt-Thomas Foundry Co.; R. W. Jones, Union Switch & Signal Co., Swissvale, Pa.; C. D. Carey, Verona Steel Casting Co., Verona, Pa.; O. C. Dobson, Carborundum Co.; J. Lloyd Uhler, Union Steel Casting Co.; W. S. McConaughy, Armor Plate Department, Carnegie Steel Co., Homestead Steel Works, Munhall, Pa.; Everett Smith, Sterling Steel Foundry Co., Braddock, Pa.

COMING MEETINGS

September

Association of Iron and Steel Electrical Engineers. Sept. 19 to 25. Annual convention, Hotel La Salle, Chicago. Secretary, J. F. Kelly, 513 Empire Building, Pittsburgh.

Annual Safety Congress. Sept. 26 to 30. Boston. Auspices of National Safety Council.

American Electrochemical Society. Sept. 29, 30 and Oct. 1. Fall meeting, Lake Placid Club, Lake Placid, N. Y. Secretary, Prof. Joseph W. Richards, Lehigh University, Bethlehem, Pa.

October

American Manufacturers Export Association. Oct. 5 and 6. Annual meeting, Waldorf-Astoria Hotel, New York. Secretary, A. W. Willmann, 160 Broadway, New York.

Society of Industrial Engineers. Oct. 5 to 7. Fall meeting, Springfield, Mass. Business Manager, George C. Dent, 327 South La Salle Street, Chicago.

National Association of Purchasing Agents. Oct. 10 to 13. Claypool Hotel, Indianapolis. Secretary, L. F. Boffey, 19 Park Place, New York.

National Implement and Vehicle Association. Oct. 12 to 14. Chicago.

National Machine Tool Builders' Association. Oct. 18, 19 and 20. Annual meeting, Hotel Astor, New York. General Manager, E. F. DuBrul, 817 Provident Bank Building, Cincinnati.

Industrial Relations Conference. Oct. 24 to 27. Harrisburg, Pa., under auspices of Department of Labor and Industry of Pennsylvania.

November

Industrial Cost Association. Nov. 2, 3 and 4. National Cost Conference, Pittsburgh. Secretary, A. A. Alles, Jr., Peoples Bank Building, Pittsburgh.

National Founders' Association. Nov. 16 and 17. Annual meeting, Hotel Astor, New York. Secretary, J. M. Taylor, 29 South La Salle Street, Chicago.

A British View of the Tariff on Vanadium

Commenting on the proposed American tariff on metals, and alloys, the *Metal Bulletin*, London, has the following in a recent issue regarding vanadium alloys:

"In view of the proposed new American tariff on imported metals and alloys, it is understood that the Board of Trade has been asked to give the subject its attention, in the interest of British manufacturers. Vanadium is a special case in point. The United States possesses a fairly complete monopoly of this metal, but as the raw material is all derived from United States-owned mines in Peru, consumers in America will be prejudiced by the duty to be imposed. Furthermore, in the case of a British manufacturer exporting to the United States steel containing vanadium, a further duty would become payable on the vanadium content, notwithstanding that the vanadium had already paid duty in the form of concentrates.

"It is a curious instance of warped mentality which advocates the exclusion of overseas products from our market, and simultaneously protests against the exclusion of our products from overseas markets. Surely what is sauce for the goose is an equally toothsome relish for the gander. The way things are going at present there will soon be no geese and consequently no use for sauce."

New Set of Weight Cards

The American Sheet & Tin Plate Co. has issued a new and revised set of weight cards covering black sheets, galvanized sheets, and formed products. These cards are 14 x 20 in. and are clearly printed. They are of particular value to all buyers and users of sheet steel, who are requested to send for them. The company will also send one of its perpetual calendars upon request.

The Titanium Alloy Mfg. Co., Niagara Falls, N. Y., announces the addition of a commercial department to its physical laboratories. There are four units: Testing laboratory, metallographic laboratory, room for experimental heat treating and small experimental foundry.

How Steel Prices Have Been Liquidated

Analysis of the Basic Facts Shows Steel Lower Than All Other Products Save Those from the Farm and Certain Metals—Building Materials and Furniture Still High

BY SIDNEY G. KOON

PERSISTENT statements, said by a daily paper to have general acceptance in Wall Street, and that have been finding their way into the financial reviews and editorial columns of the Metropolitan dailies, are to the effect that "steel has not yielded adequately"—referring, of course, to prices. One paper had it, a few days ago, that the prices of building construction materials "had broken sharply * * * before much was said about a re-action of steel quotations."

What are the facts?

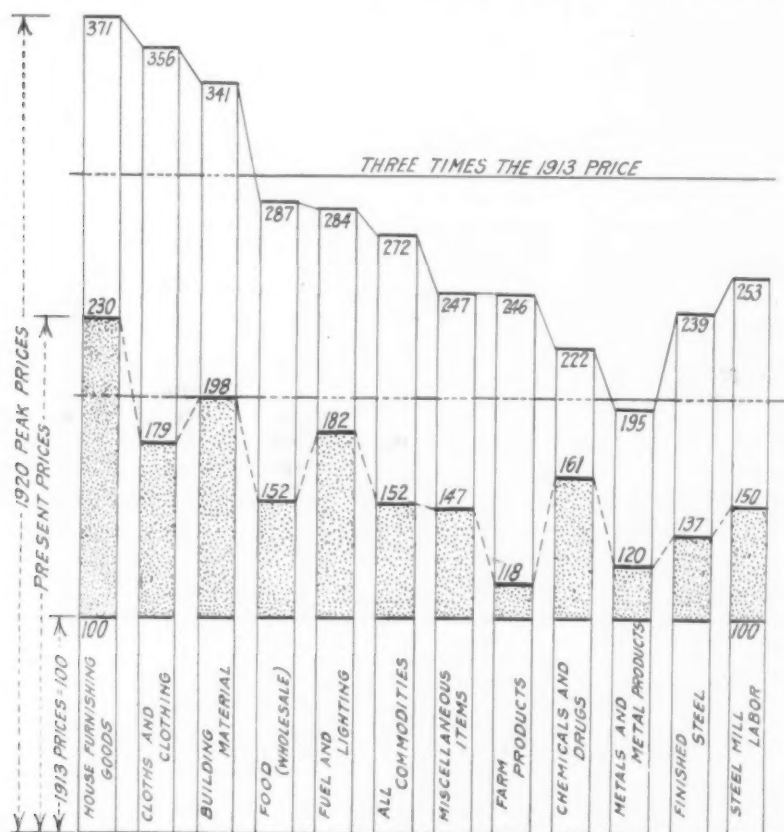
Finished steel is now 37 per cent above its 1913 average; building materials are still 98 per cent above

that margin is now below his fixed charges; it was not so before.

The question then is:

Just how much additional loss do these financial writers wish the steel industry to take in disposing of its output? Losses are now the portion of every manufacturer of steel. How much *more* loss is demanded before the admission will come that "steel has yielded adequately?"

A student of facts—not sentiment—will note that house furnishing goods are 130 per cent "up" from 1913; building materials, 98 per cent "up"; fuel and



Wholesale Prices of Nine Groups of Commodities, Together with Their Average, as Reported by the Bureau of Labor Statistics; at Right, Prices of Finished Steel, Based on THE IRON AGE Composite, and Wages of Common Labor, as Paid by the United States Steel Corporation

In each case the lower white section represents the price in 1913 (called 100). The total height of each bar shows the 1920 peak price reached by the corresponding item, the figure being shown also. The upper white section outlines the present recession from the peak of 1920. The shaded area indicates the amount by which present prices exceed those of 1913, the relative price to-day being also shown.

their 1913 level; "all commodities," comprising the nine groups studied by the United States Department of Labor, are 52 per cent above 1913. The only items below steel now are farm products and some of the non-ferrous metals—practically all being raw materials. In general, they are not manufactured products to the same extent as finished steel, and hence contain less of the high cost of labor than is found in steel.

Furthermore, so long as the assembling of the raw materials to produce a ton of finished steel requires the railroad transportation of five tons of ore, coke, limestone, coal and many smaller items, the present abnormal freight rates will continue to hit steel harder than any other major commodity produced in the United States.

Steel prices today are lower, with relation to inescapable costs, than they were before 1914. In other words, the maker of steel beams, bars, rods, wire, plates, sheets and other products has a smaller margin between cost of materials, fuel, transportation, labor and supplies, and the price he can get in the open market for his product, than he had before the war. And

lighting, 82 per cent "up"; cloths and clothing, 79 per cent "up"; chemicals and drugs, 61 per cent "up"; while steel is only 37 per cent "up." Such an investigator, still in the pursuit of facts—not sentiment—may be pardoned if he wonders why writers in "The Street" are directing their fire at a class of products which have already yielded far more than any of the others mentioned—far more than the average of all.

If completion of general liquidation is desired—and few will question it—then it would seem that the greatest gain in that direction might come from attacking the prices of products which are farthest from it. Steel being, with few exceptions, nearest to pre-war figures, any raid on it must necessarily yield more meager returns than an equally vigorous drive on those in which there is evident profiteering, some being still more than 100 per cent above the pre-war level.

Now as to the facts back of the above figures:

For some years the Bureau of Labor Statistics of the Department of Labor, Washington, has collected prices from all over the United States, from which monthly index figures of the cost of living are prepared. These are all wholesale prices. On pages 100

and 101 of the *Monthly Labor Review* for July, issued by the bureau, will be found quarterly figures from January, 1913, to January, 1918, and monthly figures from January, 1918, to May, 1921, inclusive. Average figures for each calendar year from 1913 to 1920, inclusive, are also given. Figures for June, July and August have since become available. All figures are based on the average for 1913, that average being placed at 100.

These figures cover the nine groups of commodities shown in the appended table, and the (weighted) average of all commodities. They do not include steel, as such, but cover it under the general heading "metals and metal products."

It happens that corresponding data for finished steel products are available in THE IRON AGE composite figures. During 1913, the average price per pound of steel rails, bars, beams, plates, sheets, wire and pipe was 1.663c. To-day (Sept. 19) it is 2.279c. Its 1920 peak was 3.974c. These figures, reduced to the basis of 100 for 1913, are shown in the table, as well as on the diagram. The seven products named represent 88 per cent of the total output of finished steel. THE IRON AGE composite is a straight average of the seven individual price figures.

Item	Average for 1913	Peak of 1920 Amount	Month	Present Figure
Farm products	100	246	April	118
Food, etc.	100	287	May	152
Cloths and clothing.....	100	356	Mar.	179
Fuel and lighting.....	100	284	Sept.	182
Metals and metal products...	100	195	April	120
Building materials	100	341	April	198
Chemicals and drugs.....	100	222	Sept.	161
House furnishing goods.....	100	371	Sept.	230
Miscellaneous	100	247	June	147
All commodities	100	272	May	152
Finished steel	100	239	Aug.	137
Steel mill common labor.....	100	253	All	150

Let us look at it in another way:

Steel has receded 102 "points"; in 1920 it was "up" 139 points; its liquidation is therefore 73.4 per cent. Except for the other metals and the farm products and food, not another item has liquidated so much as 70 per cent. The figures follow:

Item	1920 Excess Over 1913	Present Drop in Points from 1920	Percentage Liquidation
Farm products	146	128	87.7
Food, etc.	187	135	72.2
Cloths and clothing.....	256	177	69.1
Fuel and lighting.....	184	102	55.4
Metals and metal products..	95	75	78.9
Building materials	241	143	59.3
Chemicals and drugs.....	122	61	50.0
House furnishing goods.....	271	141	52.0
Miscellaneous	147	100	68.0
All commodities	172	120	69.8
Finished steel	139	102	73.4
Steel mill labor.....	153	103	67.3

Having studied these figures from all angles, the open-minded student of economics again faces the question:

Why do the Wall Street analysts and the financial writers strain at a 37-per cent gnat and swallow a 98-per cent camel, a 130-per cent elephant, several other 60-or-more-per cent lions? Would it be a help to better times to force the steel industry into the ruinous position of copper?

Railroads operating between Cleveland and Pittsburgh by way of Youngstown have been requested to reduce the rate on iron and steel from Pittsburgh to Cleveland. The rate of 24c. per 100 lb. is higher than the combination of the local rate from Pittsburgh to Youngstown with that from Cleveland to Youngstown. Each of these rates on steel is 10½c. per 100 lb., making the combination rate 21c. The demand for the cut is made by Cleveland interests buying steel in Pittsburgh. A hearing was conducted Sept. 14 at Columbus by representatives of the Interstate Commerce Commission.

The American Society of Safety Engineers will hold a meeting at the Engineering Societies Building, New York, Sept. 23, at 8 p.m., at which the tentative safety code for ladders will be discussed.

More Steel Men at Higher Wages

Employment in iron and steel works has taken a turn for the better, according to the August report of the Bureau of Labor Statistics, which shows a gain of 4.9 per cent in number of men employed in 113 plants, as compared with July, and a gain of 15.4 per cent in the payroll, evidencing a decrease in the proportion of men working on short time. Of course, the figures are far below those of last year, but the improvement is the first in some time.

It will be noted that the men in automobile plants are making, on the average, about 75 per cent more per day than the men in steel mills. Workers in car building and repairing are making 42 per cent more than those making the steel with which the others work.

Comparative figures for July and August, 1921, and August, 1920, in iron and steel mills, automobile factories and car building and repairing shops follow:

Month	Number of Establishments	Men	Half-Month Payroll	Average Pay Envelope
<i>Iron and Steel</i>				
July, 1921.....	113	97,902	\$3,774,977	\$38.56
August, 1921....	113	102,698	4,357,361	42.43
August, 1920....	116	180,797	13,879,882	76.77
<i>Automobiles</i>				
July, 1921.....	47	78,908	2,620,015	*33.21
August, 1921....	47	74,283	2,522,602	*33.96
August, 1920....	52	129,194	4,549,257	*35.22
<i>Car Building and Repairing</i>				
July, 1921.....	61	43,373	2,569,383	59.24
August, 1921....	61	44,201	2,672,613	60.47
August, 1920....	61	70,198	5,113,734	72.85

*Weekly.

Fabricated Steel Business in August

The amount of business booked for fabricated steel work in August showed that the recent rate has been well sustained. The total for August, according to the statistics collected by the Bridge Builders and Structural Society, George E. Gifford, New York, secretary, was 59,300 tons, compared with 60,200 tons for July. The percentage of the capacity of the country's bridge and structural shops taken by the August bookings was 33, against 33½ for July. The average for the six months ended with August was 57,550 tons, the leanest month being May, with 50,800 tons, and the best month June with 66,900 tons. The business for January and February totaled no more than 57,600 tons for the two months. The total bookings for the eight months, 403,000, was 28 per cent of rated capacity.

Canadian Production of Pig Iron, First Half of 1921

Canada's output of pig iron for the first six months of this year amounted to a little less than 70 per cent of that for the corresponding period of 1920. The actual figures for the six months' period were 309,206 long tons in 1921 and 449,810 long tons in 1920. The bulk of the output was basic iron, about one-fifth of the total being foundry iron, and a small percentage malleable iron. The output for June showed a further decline from preceding months.

On the other hand, the production of steel ingots and castings in June was the largest for any month up to the present time, the total being 64,103 long tons, or an increase of more than 12,000 tons over the May figure. The June production for this year is somewhat higher than the pre-war monthly average. The total for the six months' period, however, shows a larger slump from the level of 1920 than is the case for pig iron. The total for the half year in 1920 was 547,000 tons, as compared with 259,000 tons in 1921.

The Missouri Iron & Steel Corporation, St. Louis, with properties at Haigart, Mo., and the St. Louis Iron & Steel Co. have been merged, and the name changed to the Consolidated Steel & Iron Corporation. The board of directors also has authorized the issuance of \$2,000,000 of preferred stock.

INDUSTRIAL LEADERS

Well-Known Manufacturers Among Members of Unemployment Conference

WASHINGTON, Sept. 20.—Among those accepting invitations of the President to be members of the unemployment conference, which is to begin at 10 o'clock next Monday, are Chairman Charles M. Schwab of the Bethlehem Steel Corporation; President Clarence Mott Woolley, Detroit, of the American Radiator Co.; William Kelly, Vulcan, Mich., of the Penn Iron Mining Co.; President T. E. Edgerton, Nashville, Tenn., of the National Association of Manufacturers, and President Joseph H. DeFrees, Chicago, of the Chamber of Commerce of the United States. In all, 37 had accepted invitations to attend the conference, in addition to members of the Economic Advisory Committee of the Department of Commerce, and other replies are expected. It was intended at first to confine the list of members to 25 or 30, but it was found necessary to enlarge it.

Secretary of Commerce Hoover has been appointed by the President as chairman of the conference, and, it is announced, it is expected that it will at once dissolve into special committees for the formulation of definite plans for submission to the conference as a whole. These committees will, no doubt, it is stated, seek co-operation from further representatives of labor, employers, and civic bodies in formulation of their

views. Secretary of Labor Davis, who, of course, will be a member of the conference, has been directing a renewed survey of unemployment in preparation for the conference and co-operating in making the plans for it.

The invitations of the President state that "The conference is called to inquire into the volume and distribution of unemployment, to advise upon emergency measures that can be properly taken by employers, local authorities and civic bodies, and to consider such measures as would tend to give impulse to the recovery of business and commerce to normal."

In the announcement given out by Secretary Hoover it is stated:

"In naming the members of the conference, it has been the desire of the President to secure geographic representation and at the same time have regard to the different elements of the community who are interested and can be helpful in the problem without any attempt at proportional members of particular groups. Those of experience in those industries where there is the largest degree of unemployment have been called upon in larger proportion than from trades where there is less unemployment difficulty. It was impossible to include representation of the whole of some 50 trade groups in the conference and hold its size within workable limits."

Organized labor is to be represented by a number of conferees, among them being President Samuel Gompers of the American Federation of Labor.

AGAINST STOP-WATCH STUDIES

A Second Address by Frank B. Gilbreth Before Members of the Taylor Society

At a dinner meeting of the New York section of the Taylor Society, held at the Flatiron Building restaurant, Sept. 15, Dr. Frank B. Gilbreth, consulting engineer, Montclair, N. J., continued his arraignment of stop-watch time studies in a paper entitled "Micro-Motion Study for Current Use." In it he replied to criticisms of a previous paper of his, made at the April 11 meeting of the Philadelphia section and subsequently published in the June Taylor Society bulletin. In publishing the criticisms, the editor, Dr. H. S. Person, managing director of the society, asked Dr. and Mrs. Gilbreth for more data—descriptions of cases and figures contrasting micro-motion and stop-watch results and suggested a continuation of the discussion of time study. Dr. Gilbreth was vigorous, both in matter and in manner, in making his answer and the evening's discussion was at times heated. The paper, which was a detailed refutation of the arguments of the opponents of micro-motion studies, was read only in part. In summing up, Dr. Gilbreth said:

"According to the managing director of the Taylor Society, the one and only point remaining at issue is conceded to be 'whether the stop-watch technique is so unscientific as to be unsuitable for the determination of standard times and standard rates as a basis for current wage contracts.' What proof has been offered, and in the light of the evidence by what stretch of the imagination can the inaccurate non-method recording stop-watch method be called scientific?"

"We have shown that the Taylor philosophy does not countenance standard rates unless founded on real standard times. This leaves simply standard times for current use.

"We ask now, Do the stop-watch advocates still want times for current use only? If so, we claim that even then we can secure more accurate data for less cost.

"If they concede any use for such data in addition to 'current use,' we have still further won our contention, on this one remaining point at issue as to the relative merits of the two methods. for we can furnish all such necessary data, whatever its use.

"Our data are and will continue to be accurate, and their cost as used for current use is and will be

negligible, for our data for current use are a by-product of data for permanent use.

"Dr. Person has made certain requests, for the Taylor Society and the public. We have been and shall be glad to accede to these requests. We now consider ourselves justified in making a few requests, as follows:

"1. Of the stop-watch time study men, that they state exactly what they claim their inaccurate non-method-recording stop watch can do for standard times for 'current use' that the micromotion study method cannot do far better.

"2. Of the Taylor Society, that after such data as are requested are submitted, it evaluate the data and publish the findings, without fear or favor, for the sake of science in management.

"3. Of the Taylor Society, that it determine at once the stand that it proposes to take on the subject of accuracy of fundamental data of management and decide whether it intends to live up to its name as a 'society to promote the science of management' or not.

"4. Of Dr. Person, that he write a paper in which he reviews the 'creed of the management engineer' in its relation to time study and estimates the extent to which this society has lived up to that creed, laying special stress upon keeping faith with one's science and one's fellow engineers, for such faith lies at the base of faith with one's clients and with the community."

Among those taking part in the discussion were Dr. H. S. Person, W. N. Polakov and W. H. Leffingwell. The chairman of the meeting was H. A. Hopf, of the Federal Reserve Bank.

The Basset Direct Process Not Yet Commercial

The report of the Société d'Ougrée-Marihay (Belgium) a large shareholder in the French Basset Co., warrants the conclusion that the Basset process of iron and steel manufacture has not yet passed the experimental stage, and that the revolution in metallurgy promised by M. Lucien Basset seems still to be far from realization. This statement is made by the London *Ironmonger*.

Ford cars to the number of 117,696 were shipped in August; Studebaker cars were 8642 in number. Shipments of automobiles amounted to 2 per cent above July, but were 28 per cent below August, 1920.

Great Activity at German Steel Works

Most Mills Sold Up for This Year—Semi-Finished Materials Scarce—Heavy Export Selling, Particularly in Railroad Lines

(By Aerial Mail to London)

BERLIN, Sept. 2.—The heavily increased demand in the German iron and steel market which set in with the renewed drop of the mark three weeks ago has assumed still greater proportions and industry is evidently on the eve of another boom period which may outrival that of 1919 to 1920. Prices have been climbing at an unprecedented rate during the past few weeks and there are no indications of a slowing down as yet.

An examination of the causes responsible for the tremendous activity obtaining at the mills shows that the depreciation of the German exchange represents a large share of the present prosperity, evidenced by the heavy export orders. In the domestic market, too, the effects of the fresh deterioration of the mark are noticeable. Customers are anticipating further price advances resulting from dearer raw materials and are overwhelming mills with orders. Aside from the purely speculative reasons, there are other underlying motives of the present boom. The proposed new taxes, whatever their ultimate form, will lead to a general increase of production and living costs. The latter have already sharply risen during the past month and show a further upward tendency. Strikes have been more numerous of late and may be considered as a prelude to another period of wage claims. Serious economic disturbances appear unlikely, as industry has done very well during the past year and can well afford to pay increased wages. The "buyers' strike" no longer exists. It is noteworthy that the rapid upward trend of the market is in a measure caused by a gradual revival of the building trade, where many big projects such as canals, locks, long distance power stations, etc., call for fairly large tonnages of material.

Many Mills Filled for the Year

Under pressure of the enormous demand, mills are finding it difficult to cope with incoming orders. Rhenish-Westphalian mills are now, generally stipulating terms of delivery ranging between 3 and 4 months and most of the mills are sold up for the remainder of the year. Such is the activity in some departments that mills frequently refuse orders or deliberately quote prohibitive prices.

The heaviest price increases have been in the sheet market where 3100 m. (\$29.55) per ton is now being named for light plates as compared with 2000 m. (\$19.00) at the end of May. Bar iron has jumped to 2700 m. (\$25.65) and the Hösch steel works is reported to be asking even 2800 m. (\$26.60). The Krupp-Rheinhausen is offering limited quantities of material only, because of the heavy call by the various works of the concern, and the same applies to the Gutehoffnungshütte. The Dortmunder Union has still a limited tonnage to clear off; Phoenix is accepting bar iron specifications for larger gages only. Thyssen, Rhenische Stahlwerke and Haspe are still in a position to meet the demand though quoting higher prices.

Increased Demand for Pig Iron

With the general improvement, a better tone prevails in the pig iron market. Demand by foundries is active and shipments, which showed an increase of 25 per cent during July compared with June, registered a further increase in August.

There is a marked scarcity of semi-finished material. Sheet mills are reporting very satisfactory orders, particularly in light plates, while heavy sheets are less in demand because of the temporary lull in shipbuilding caused by the slump in ocean freight rates, the repurchase of former German vessels, and the precarious situation in international shipbuilding. By far the greatest activity prevails in the wire market, where domestic customers have difficulty in obtaining material, as mills are engaged on large export orders. Base prices for wire nails are around 330 m. (\$3.14)

per 100 kg. and for open-hearth bolt and rivet stock 350 m. (\$3.33) is named. Large export sales of galvanized wire have been made recently with prices in the neighborhood of £12 15s. 6d. (\$48.29) per metric ton f. o. b. Hamburg, for No. 8 gage. Demand for barbed wire is also good although prices have not been advancing as rapidly, latest export quotations being 400 m. (\$3.80) per 100 kg. f.o.b. Hamburg. The majority of wire mills have specifications on hand for four months ahead and small orders for early delivery are only accepted at premiums.

Export Movement Growing

It is evident that the prolonged struggle in the English coal mining industry as well as the conditions which recently prevailed in Upper Silesia have enabled the Rhenish-Westphalian industry to strengthen its position in the international market. "The German iron industry, aided by the low value of the mark, has at present very little to fear from foreign competition, with the possible exception of the United States." This is the view of a prominent industrialist. Foreign inquiries and orders have been rather numerous, even Belgians appearing as buyers. Japan and China have been heavy buyers of bar iron, while Holland and the United Kingdom have been in the market for rails and track supplies. Apart from wire and wire products, bar iron and sheets are the principal export items. Scandinavian customers have lately contracted for large shipments of light plates, particularly dynamo and transformer sheets. The Russian Soviet Government is also actively buying and has just closed for immediate delivery of a large tonnage of wire nails. Some of the export orders include railroad cars for Belgium, while the agricultural machinery and implement manufacturers have booked substantial orders in Holland and Roumania. The Steffens & Nölle construction shops have just been awarded the contract for the building of a railroad bridge across the Nirova, at Narva, by the Esthonian government. The contract will probably total 26,000,000 Esthonian marks. The German tender is stated to have been 11 per cent lower than the lowest British offer. A list of 10 cranes to be erected at the port of Reval will probably also go to German firms. On tenders recently issued by the Bulgarian Government for railroad freight cars, German quotations were lower than French, Belgian, Italian, and Czecho-Slovakian competition and were close to the lowest bidder, Hungary.

We quote as follows per metric ton; with prices for export averaging 5 per cent higher:

	Marks	
Ingot	1,650	\$15.67
Blooms	1,900	18.05
Billets	1,900	18.05
Sheet bars	1,950	18.52
Bar iron	2,700	25.65
Structural shapes	2,650	25.17
Squares and rounds	2,550	24.22
Flats	2,400	22.80
Angles	2,500	23.75
Hoop iron	2,600	24.70
Wire rods	2,700	25.65
Sheets, heavy	2,200	20.90
Sheets, medium	2,500	23.75
Plates, light	3,100	29.45
Sheets for stamping, planished	4,000	38.00
Sheets, galvanized	5,000	47.50
Pipe		
Boiler tubes, 2 1/2 in., per meter	22	0.21
Boiler tubes, 3 in., per meter	33	0.31
Gas pipe, 1 in., per meter	11	0.10
Gas pipe, 1 1/2 in., per meter	18	0.17
Gas pipe, 1 in., galvanized, per meter	27	0.26

The Heller Brothers Co., 879 Mount Prospect Avenue, Newark, N. J., has merged its subsidiary organizations, the Rex File Co. and the Vixen Tool Co., under the Heller Brothers name.

BELGIAN MARKET IMPROVES

Decline in Prices Halted—Mills Make Better Deliveries Than Germany—Government Buys 60,000 Tons of Rails

(Special Correspondence)

CHARLEROI, BELGIUM, Sept. 3.—Following a period of almost unparalleled depression, the Belgian market latterly has shown distinct signs of improvement. It is too soon to anticipate a steady advance of prices during the coming months, but it means much that the downward movement of prices has been halted. Prices had reached a level which rendered profitable operation of mills impossible. Three factors of the recent improvement merit attention: First, it should be borne in mind that production had been reduced to a minimum during the past few months, output of pig iron in July amounting to 45,000 tons compared with 93,000 tons average monthly production during 1920. Obviously any slight increase in demand would immediately affect the market and recent weeks have shown clearly that production was inadequate to meet the demand. Second, the German iron industry is brimming with activity and while German quotations are lower than any Continental prices, the mills are unable to compete with Belgian producers on delivery. So great is the discrepancy in terms of delivery that in many markets German competition is practically eliminated for the present. Third, inquiries and orders from abroad, especially overseas, have been rather satisfactory of late. Japanese importers have been active in the Belgian market during the past fortnight.

The Saint-Léonard Co. at Liege has secured an order from a Spanish railroad company for 20 locomotives and tenders on a bid of 3.67 pesetas per kilo for engines and 1.92 pesetas for tenders, the total contract being valued at 5,562,000 pesetas. The Compagnie Centrale de Constructions, Haine-St. Pierre, has booked an order for 250 cars for China. The Franco-Belge Co. at La Croyere have orders on hand valued at 76,000,000 fr. China placed an order for 13 cars, 12 freight cars, and 8 bridges of 30 meters span each with the Ragneno Works at Malines, totaling 9,000,000 fr. A rail order for 4000 tons for the Dutch colonies went to the Rehon works of the La Providence Co. at Marchienne-au-Pont.

Outstanding in domestic business is the Government order for 60,000 tons of rails and track supplies.

Iron of British Analysis Produced

An interesting feature of the pig iron market, aside from the resumption of operations at some stacks which have been idle, is the adaptation of production to English demands. The Providence Belge, for instance, is now producing a special grade of pig iron of high manganese and low phosphorus content such as is turned out by Scottish furnaces. For this grade 265 fr. per ton is asked compared with 225 fr. for inland foundry iron No. 3. The present price of Belgian basic pig iron is around 185 fr.

Demand for semi-finished material has also been better during the past fortnight. Although supplies of domestic producers are not large, no arrangements for increasing production are reported, so far mills evidently preferring to continue obtaining their material from France and Luxemburg. Nominal quotations are as follows: Basic blooms 280 fr., basic billets 295 fr. sheet bars, 315 fr. With foreign material dominating the situation, however, there can be no consideration of a "Belgian" market in semi-finished material.

The general improvement is reflected in a hardening of prices for finished material although no distinct betterment can be reported as yet. Beams, bolts and nuts, and the tube market are still unsatisfactory but hoops and sheets as well as bars have recovered. Export quotations for Belgian mild steel bars advanced by 2s. 6d. to £8 2s. 6d. to £8 5s. probably as a result of a rise in Luxemburg export quotations. Wrought iron bar No. 3 also registered a slight recovery, quoting about £8 12s. f.o.b. Antwerp, while No. 2 iron remained

stationary at £7 10s. to £8. No material change has taken place in domestic quotations. A marked revival is noted in the hoop iron market where present export prices have reached the 500 fr. level compared with an average inland price of 520 fr. and some makers even naming 550 fr. Cold rolled material, however, under pressure of German competition, has remained unchanged. The rail market, through recent substantial domestic and foreign orders, is developing favorably with prices tending upward. A rapid change has come over the wire market. Although the mills had to lower domestic and export prices toward the middle of August, the past fortnight brought a fair volume of orders, particularly from the Far East, for wire rods and products, sending prices up to the level of the first week of August. We quote galvanized wire for export at 18s., plain bright wire at 14s., barbed wire at 20s., and nails at 14s. per 100 kg. f. o. b. Antwerp. Tube prices were reduced 5 per cent.

Exports of Pig Iron, Bar Iron and Rails Increase

A factor in the further improvement of the market is the extent to which French competition may be effective. It is noteworthy that the Government recently made a 50 per cent reduction in freight rates on ores from the frontier to Liege and Charleroi, which corresponds to about 10 fr. per ton and is expected to result in cheapening of production costs by 30 to 40 fr. per ton. It is hoped that this reduction will bring Belgian prices to a competitive basis. On the other hand, this advantage is offset by the marked reduction of French coke prices (30 fr. per ton) while the declared readiness of the French Government to lower freight rates on iron and steel with a view to aiding export trade is being seriously considered. Belgian iron and steel exports during the first half of 1921, compared with the same period of 1920, are shown below:

	Metric Tons—	
	1921	1920
Pig iron	61,251	4,698
Semi-finished	3,100	2,700
Sheets and plates	61,910	52,997
Bar iron	223,978	139,771
Beams, girders, etc.	19,767	18,061
Rails	67,344	15,570
Wire and wire nails	29,000	30,000
Cast-steel products, machined..	33,000	27,700

The bar iron figures are significant. Not only have shipments been nearly doubled compared with 1920 but a comparison with the 1913 figures—308,706 tons, shows that this year's exports are 75 per cent greater than those of the last peace year.

Situation in France Unfavorable

LONGWY, FRANCE, Aug. 29.—Very few furnaces are in operation in Lorraine, only 18 units working out of the 67 existing furnaces. The de Wendel works is responsible for 9 furnaces, Knutange for 2, the Hagondange works 3, Rombas 2, Auduh 1, and Thionville works 1 furnace. In Strassburg the labor agitation against wage reductions is still acute and the workers are returning to work with great reluctance. The coal traffic at the harbor of Strassburg is increasing, large quantities of fuel being shipped from the Ruhr and Sarre districts.

It does not appear that the reduction of 50 francs per ton in the price of coke will seriously affect the price of pig iron. The pig iron producers have been operating at a loss and no substantial reduction seems possible. The manufacturing consumers of iron are complaining that no reduction has been decided on in the price of fuel for their use, the decline of 50 francs applying only to the steel works and furnaces.

In the automobile industry there is a slight improvement. The Peugeot works is now producing 700 cars and 250 motorcycles per month. French manufacturers are extremely anxious to receive a share of the large specifications which have been submitted to them recently. Two steel works have booked 12,000 tons of heavy section rails. Output in light sheets is so curtailed that it is almost impossible to obtain sufficient for the automobile industry.

ON THE ART OF BUYING

Profits and Growth of Business Depend Upon Wisdom in Purchases

BY JOHN J. RALPH*

Buying is the crystallization of all thought, initiative, planning and dreaming of the entire organization. It is the most important single concrete thing done by the entire organization. All moneys received from any source, less profits and plus losses, are expended as a result of past or present buying.

In all times the prophet has been the most honored of men and considered to be the wisest. The past is past and we can find those who can tell of it. The present is here and what is is. The future is to come and who can tell what is to be? Yet every purchase made is a gamble on the buyer's foresight into the future.

For every purchase made the buyer receives his reward. If wise, it is profit; if unwise, a loss. Further, every unmade purchase which hindsight shows would have been wise nets a loss in profits foregone. Caught between alternatives, he must buy, for unless he buys he cannot sell.

In ordinary times, when conditions are seemingly constant and the future cast in the same mold as the present, and there is no indication of crisis, the problems of buying seem simple. Just anticipate the same for to-morrow as is happening to-day, plus the normal increase or less the normal decrease.

Mistakes in buying are absorbed without realization of the foregone profits, and not until they have sapped the life blood and there is no longer vitality to meet new competition, changed industrial conditions, or new methods of production, are mistakes realized.

Buying as a Function of Management

Buying is not an independent operation. It is a distinct function of management and is the final declaration of decisions reached. Costs are a combination of the results of past buying and present purchases. Overhead is the cost of capitalized past buying. Running expense is the cost of present buying. Sales costs are the price paid for the distribution of product.

What fixes the price obtained for product? Demand, competition and supply. Competition is largely misunderstood. It embraces competition of dissimilar goods as well as the struggle between producers of the same article. This very largely fixes price. Profits are the difference between price and cost, are they not? Yet cost is the price of buying.

Buying is an opportunity. Always there have been those who made profits in every line. To-day in almost all fields there are those starting out who will grow, and some who will become great. This will come because of their management, and the final showing of their management will be in their purchases.

Some will purchase with foresight. Others will live through their ability to purchase knowledge and skill. Not a few will score through wise buying of production equipment. Money is the master instrument of others, while many will find their living margin in their ability to obtain distribution at low cost.

A certain amount of foresight in each of these will insure success. Pre-eminence in each will make certain not only growth but phenomenal results.

The high cost of sales is really the high cost of buying. Who pays the selling cost in any industry? The man who buys the products of that industry. And he pays the cumulative cost of all the previous buying, clean down to the raw materials as they are taken out of the earth.

The Different Elements in Buying

All buying is not equally important. The purchase that saves ten dollars per year for ten years is many times more important than the purchase that will save twenty dollars this year. Neglecting to make a purchase that will make ten dollars for ten years is many times as serious an oversight as that which loses

twenty dollars in the bill that comes in to-morrow for goods to be used immediately.

Of prime importance is, of course, the basic purchase involving site and building selection. On this will depend largely the overhead the plant will be under during its natural life. Labor, taxes and transportation ease or trouble are what are bought with the site and building, also an interest charge. These will have their effect on every dollar's worth of product put out. Hidden away in the balance sheet, not realized for what it is, for all the coming years it pays dividends for foresight or takes toll for the lack.

Of less importance is the equipment, for the life of this is not so long, and losses here can be more easily seen and remedies applied. But the importance is greater per dollar of purchase than for current goods, because it is also a mortgage on the future, and the product cost sheet renders a daily and yearly judgment on the quality of the purchase.

Per dollar, current buying is the least important, for it is in the plant to-day and released to-morrow. The total of profit and loss is small per unit and is quickly taken. Yet while it is the least important, it is the most insistent in making itself recognized. If one's judgment has been vindicated, the proof is easy, and quickly seen in the variation of price level or in the ease or difficulty of passage of product through the shop. If that judgment has been bad, there is the pile of scrap in the yard that tells of poor quality, the customer's complaint, or the tell-tale market quotation.

Yet even in this purchasing there is one type of error of judgment for which there is no penalty record. Where in the balance sheet is the item that says—

Lost Sales due to:

Improper working tools and consequent lack of quality?

High prices, the result of cumulative bad buying?

Poor prices due to:

Inferior product or out of date design and materials?

Neither these nor several other items are to read from the yearly balance sheet, for that tell-tale shows only what was done, and offers no recrimination on the results and penalties paid for sins of omission.

The Influence of Quantity

The design and characteristics of the output having been settled, there is a tendency to consider the matter closed, and to feel that further buying for materials and current supplies is merely a matter of form. This is not correct. No judgment that covers a period of time should be treated as absolutely right, for there is always an advance possible in the art, whether in the development of new materials, new methods of manufacture, or new possibilities of perfection of output.

In many cases the savings possible on any one piece are extremely small, but the cumulative effect may well be large. Five dollars is not large, but five dollars net is 5 per cent on \$100 of investment, and it is upon net returns on investment that the health of any enterprise depends.

Electrical Engineers Meet

CHICAGO, Sept. 20.—The Association of Iron and Steel Electrical Engineers convened at Hotel LaSalle, Chicago, yesterday, for a five-day meeting, with an attendance of 500. On Tuesday afternoon, the members were the guests of Chicago independent steel mills at an outing held at Northwestern Park, near Chicago. Games and dancing were features of the program. The association has added 125 members in the last nine months, its present enrollment being 1350.

The first meeting of the newly organized Associated Technical Societies of Detroit, was held in the Detroit Board of Commerce, Sept. 16. Prof. John C. Parker, of the University of Michigan, presented the ideas and aims of the new organization. Every technical association in Detroit was represented at the meeting.

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Iron and Steel Markets

IMPROVEMENT HOLDS

Chiefly in the Lighter Products

An Advance in Sheets—Heavy Lines Still Unstable

The steel trade recognizes the good effect of the stir in the wire trade connected with the recent price advance, and on a smaller scale the sheet market has had some notice in the past week. Three or four independent companies have announced an advance of \$5 per ton. It is not yet clear how far this will be followed. The Steel Corporation has made no change, though it is expected to do so, and thus far the chief effect has been to give a few mills more sheet orders at their former prices than they have had in some weeks.

The larger contribution the lighter products—wire, sheets and tin plates—are making to current mill operations is emphasized by a further slight increase in total steel output, as expressed in ingots, at the same time that the heavier products—rails, plates, structural shapes and bars—show on the whole no increase.

A gradual increase in the buying of steel, even though actual consumption may not change in any marked degree, is a common expectation for the autumn months, but buying for forward delivery is not looked for until 1922. Meanwhile there is a definite effort by steel manufacturers to limit their losses on current business. Plate mills particularly have suffered, and in several cases such mills have been shut down to await some sign of price stability.

An effort is being made in the Pittsburgh district to lift the prices of semi-finished material. Recently on a 5000-ton inquiry for slabs \$29 at Youngstown was quoted, as against the usual \$30, but later the \$29 price was withdrawn.

There are indications that makers of hoops, bands and strips will make a stand for a \$5 advance over the recent low level in that line.

Reductions in wrought pipe announced Sept. 16, amounting to \$8 to \$10 per ton on standard and line pipe, only recognized formally the lower basis on which sales had been made for some time. There is a \$10 reduction on lapweld steel boiler tubes, but the seamless tube trade continues without published prices. Presumably iron pipe will not remain above the level of steel.

Structural steel lettings, which at times seem to be increasing, are shown to have been fairly uniform for six months ending with August. The August total was 59,300 tons, or about one-third of a month's fabricating capacity, while the six months' average was 57,550 tons. Lower prices continue to be reported on fabricating and erecting. At Chicago the uncertainties of building trades wages are holding back much projected work.

Recent price advances on Northern pig iron have given Southern iron an opportunity to come into Northern markets, but no large sales have been made. Considerable business is still pending in the East, including one inquiry for 10,000 tons from a Massachusetts melter. Some eastern Pennsyl-

vania furnaces have advanced their quotations 50c. and sales of 5500 tons of basic in the Pittsburgh district have been accompanied by an advance of 25c., making the prevailing quotation \$19.25, Valley. Buyers in the Chicago district are specifying more freely and throughout the country the pig iron market is showing more firmness.

On the present low rate of production sellers of pig iron still have a margin on which prices may be edged up further, without giving owners of idle furnaces encouragement to blow in.

Inquiries for small lots of lake iron ore have been received at Cleveland from companies which usually produce steel-making iron only, but are considering going into the manufacture of foundry iron if suitable ore can be obtained at price concessions. It is now estimated that the shipments of ore by lake will not exceed 21,000,000 tons.

The reduction in British ferromanganese to \$58.35 at Baltimore and Philadelphia has led to a fair amount of buying, and domestic ferromanganese has been reduced to equivalent delivered prices.

Exports of iron and steel for August are estimated at 73,792 tons, apart from several unimportant items unreported. This is the lowest tonnage since January, 1909, and compares with 86,523 tons in July, 1921, and 431,484 tons in August, 1920.

On the recent 4000-ton Japanese rail order placed in this country the delivered price was slightly under \$50, much of the freight being absorbed by Japanese interests having vessel space. Another export inquiry on which there is sharp international competition is for 16,000 tons of 80-lb. rails for the Bolivian Government.

Pittsburgh

PITTSBURGH, Sept. 20.

Realization on the part of steel manufacturers that recent prices over-discounted such benefits as have accrued from the liquidation of labor and other costs is finding reflection in an effort to put back prices to levels more nearly in line with present day conditions. The Brier Hill Steel Co. and the Inland Steel Co. in the past week announced an advance of \$5 per ton in the prices of sheets, and this step has been followed by all but a few of the other independent makers. The American Sheet & Tin Plate Co. has not yet taken action, although it is admitted officially that it will make this advance. Effort also is being made to lift the prices of semi-finished material and it is probable that before this week ends makers of hoops, bands and strips will announce an increase of \$5 per ton over the recent low point. Meanwhile, the recent advance in wire products gradually is being established, at least on nails, sales of which have been made at \$2.90 base, per keg, Pittsburgh. Actual advances in other products are lacking, but in a broad way steel manufacturers are making a good deal of an effort to get away from ruinous prices, as recent competitive quotations are commonly designated. The only exception to this trend has been steel tubular goods, which the National Tube Co. reduced \$8 to \$10 per ton, effective Sept. 16, this reduction being met by all of the independent makers.

Fairly good business continues in the lighter

A Comparison of Prices

Advances Over the Previous Week in Heavy Type, Declines in Italics
At date, one week, one month, and one year previous

For Early Delivery

Pig Iron, Per Gross Ton:	Sept. 20, 1921	Sept. 13, 1921	Aug. 23, 1921	Sept. 21, 1920
No. 2X, Philadelphia	\$21.34	\$20.84	\$20.84	\$53.51
No. 2, Valley furnace	21.00	21.00	20.00	50.00
No. 2, Southern, Cin'tif.	23.50	23.50	23.50	46.50
No. 2, Birmingham, Ala.	19.00	19.00	19.00	42.00
No. 2, foundry, Chicago*	22.00	22.00	20.00	46.00
Basic, del'd, eastern Pa.	19.25	19.25	19.00	51.26
Basic, Valley furnace	19.25	19.00	18.00	48.50
Bessemer, Pittsburgh	21.96	21.96	21.96	50.46
Malleable, Chicago*	22.00	22.00	20.00	46.50
Malleable, Valley	20.00	20.00	20.00	50.00
Gray forge, Pittsburgh	21.96	21.96	21.46	50.96
L. S. charcoal, Chicago	33.50	33.50	33.50	58.50
Ferromanganese, del'd	60.00	70.00	70.00	....

Rails, Billets, etc., Per Gross Ton:	Sept. 20, 1921	Sept. 13, 1921	Aug. 23, 1921	Sept. 21, 1920
Bess. rails, heavy, at mill.	\$45.00	\$45.00	\$45.00	\$55.00
O-h. rails, heavy, at mill.	47.00	47.00	47.00	57.00
Bess. billets, Pittsburgh	29.00	29.00	29.00	60.00
O-h. billets, Pittsburgh	29.00	29.00	29.00	60.00
O-h. sheet bars, P'gh.	30.00	30.00	30.00	67.50
Forging billets, base, P'gh.	34.00	34.00	34.00	75.00
O-h. billets, Phila.	35.74	35.74	35.74	65.74
Wire rods, Pittsburgh	41.00	38.00	42.00	75.00
	Cents	Cents	Cents	Cents
Skelp, gr. steel, P'gh., lb.	1.65	1.70	1.75	3.25

Finished Iron and Steel,	Sept. 20, 1921	Sept. 13, 1921	Aug. 23, 1921	Sept. 21, 1920
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Iron bars, Philadelphia	1.95	1.95	2.00	4.85
Iron bars, Chicago	1.75	1.75	1.75	3.75
Steel bars, Pittsburgh	1.60	1.65	1.75	3.25
Steel bars, Chicago	1.75	1.85	1.93	2.73
Steel bars, New York	1.98	2.03	2.13	4.13
Tank plates, Pittsburgh	1.60	1.65	1.80	3.25
Tank plates, Chicago	1.75	1.75	1.98	3.03
Tank plates, New York	1.98	2.03	2.18	3.63
Beams, etc., Pittsburgh	1.60	1.65	1.80	3.10
Beams, Chicago	1.80	1.80	1.98	2.83
Beams, etc., New York	1.98	2.03	2.18	3.48
Steel hoops, Pittsburgh	2.15	2.15	2.25	5.50

*The average switching charge for delivery to foundries in the Chicago district is 50c. per ton.

†Silicon, 1.75 to 2.25. ‡Silicon, 2.25 to 2.75.

The prices in the above table are for domestic delivery and do not necessarily apply to export business.

Sheets, Nails and Wire, Per Lb. to Large Buyers:	Sept. 20, 1921	Sept. 13, 1921	Aug. 23, 1921	Sept. 21, 1920
	Cents	Cents	Cents	Cents
Sheets, black, No. 28, P'gh.	2.75	2.75	2.75	7.50
Sheets, galv., No. 28, P'gh.	3.75	3.75	3.75	9.00
Sheets, blue an'd, 9 & 10.	2.20	2.20	2.25	5.50
Wire nails, Pittsburgh	2.90	2.90	2.75	4.25
Plain wire, P'gh.	2.60	2.60	2.50	3.75
Barbed wire, galv., P'gh.	3.55	3.55	3.40	4.45
Tin plate, 100-lb. box, P'gh.	\$5.25	\$5.25	\$5.25	\$9.00

Old Material, Per Gross Ton:	Sept. 20, 1921	Sept. 13, 1921	Aug. 23, 1921	Sept. 21, 1920
Carwheels, Chicago	\$14.50	\$14.00	\$13.00	\$37.00
Carwheels, Philadelphia	17.00	17.00	17.00	43.00
Heavy steel scrap, P'gh.	14.00	13.50	13.00	28.50
Heavy steel scrap, Phila.	11.50	11.50	11.50	25.50
Heavy steel scrap, Ch'go.	11.50	11.00	11.00	24.50
No. 1 cast, Pittsburgh	17.00	17.00	16.50	42.00
No. 1 cast, Philadelphia	17.00	17.00	17.00	40.00
No. 1 cast, Ch'go (net ton)	13.25	13.25	13.00	33.50
No. 1 RR. wrot. Phila.	15.00	15.00	14.00	34.00
No. 1 RR. wrot. Ch'go (net)	11.50	11.50	11.00	23.50

Coke, Connellsville, Per Net Ton at Oven:	Sept. 20, 1921	Sept. 13, 1921	Aug. 23, 1921	Sept. 21, 1920
Furnace coke, prompt	\$3.25	\$3.25	\$2.75	\$16.50
Foundry coke, prompt	4.25	4.25	3.75	17.50

Metals

Per Lb. to Large Buyers:	Sept. 20, 1921	Sept. 13, 1921	Aug. 23, 1921	Sept. 21, 1920
	Cents	Cents	Cents	Cents
Lake copper, New York	12.25	12.25	12.00	18.75
Electrolytic copper, N. Y.	12.12 1/2	12.00	11.75	18.75
Zinc, St. Louis	4.77 1/2	4.20	4.17 1/2	7.80
Zinc, New York	4.67 1/2	4.70	4.67 1/2	7.80
Lead, St. Louis	4.45	4.40	4.25	8.25
Lead, New York	4.65	4.60	4.40	8.00
Tin, New York	26.50	26.75	26.12 1/2	44.00
Antimony (Asiatic), N. Y.	4.45	4.45	4.50	7.12 1/2

Composite Price, Sept. 20, 1921, Finished Steel, 2.200c. Per Lb.

Based on prices of steel bars, beams, tank plates, plain wire, open-hearth rails, black pipe and black sheets	These products constitute 88 per cent of the United States output of finished steel.	Sept. 13, 1921,	2.279c.
		Aug. 23, 1921,	2.321c.
		Sept. 21, 1920,	3.974c.
		10-year pre-war average,	1.684c.

Composite Price, Sept. 20, 1921, Pig Iron, \$20.01 Per Gross Ton

Based on average of basic and foundry irons, the basic being Valley quotation, the foundry an average of Chicago, Philadelphia and Birmingham		Sept. 13, 1921,	\$19.81
		Aug. 23, 1921,	18.97
		Sept. 21, 1920,	47.83
		10-year pre-war average,	15.72

products, such as nails, wire, sheets and tin plate, and the response to the reduction in steel pipe has been satisfactory, at least as far as merchant pipe is concerned. The heavier lines still are sluggish, although some fair sized structural projects recently booked by the American Bridge Co. have brought business in plain material to the Carnegie Steel Co. There is not much question that the slant of demand is upward, but to chart it would disclose a saw-tooth, rather than a straight line. The common expectation is that the remainder of the year will see a gradual increase in business, but there are few who expect that the industry will get into anything resembling a normal stride until next spring. It is emphasized this week that so long as railroad freight rates remain unliquidated and are an obstacle to a reduction in costs and selling prices, there hardly will be confident buying. Few now expect that there will be any reduction in rates before Jan. 1.

General plant operations are somewhat heavier than they were recently, but the gain is chiefly on the side of finishing mills. The Jones & Laughlin Steel Co. last week put on an additional blast furnace at its Woodlawn, Pa., works to make Bessemer iron because of the demands for merchant pipe. This change, however, is

accompanied by some reduction in open-hearth furnace operations. A few open hearths have gone on in the Youngstown district and the Wheeling Steel Corporation has resumed making steel at its Portsmouth, Ohio, works. There has been an increase in active ingot capacity of Carnegie Steel Co. of about 5 per cent from the average of the past few weeks. The plants of the American Steel & Wire Co. in th's district are running heavier, both in the making and the finishing of steel. The American Sheet & Tin Plate Co. is running 70 per cent of its sheet mills and more than 50 per cent of its tin plate mills, or about double the rate of a month ago. Mattie Furnace of the A. M. Byers Co., at Girard, Ohio, will go into blast about Oct. 1.

The pig iron market is dull but firm. The trend of scrap prices still is upward, but the flurry in coke occasioned by the appearance of several inquiries at the time when labor troubles threatened appears to be subsiding.

Pig Iron.—Although actual business is extremely limited, there is no sign of uneasiness on the part of producers, and consequently no tendency to deviate from prices established a few weeks ago. We are raising the minimum price on basic iron 25c. per ton to \$19.25, because three lots involving 5500 tons re-

cently were sold at that price and there is nothing to indicate that any tonnages now are available at less. The asking price of all makers on this grade is \$20, furnace, but as yet this figure has not found basis in sales. Only carload lots of Bessemer are being moved and these usually at \$20, Valley furnace. There is one inquiry for 1500 tons of Bessemer but the specification calls for iron of less than 0.02 in sulphur and few makers are interested. One who has some iron of this kind has quoted \$21, Valley furnace, against the inquiry. The National Radiator Co. has put out an inquiry for 3000 tons of No. 2 and No. 2X foundry iron for delivery over the remainder of the year, in equal amounts, to its plants at New Castle and Johnstown, Pa., and Trenton, N. J. The price of \$21, furnace, for No. 1 grade is well observed.

We quote Valley furnace, the freight rate for delivery to the Cleveland or Pittsburgh district being \$1.96 per gross ton:

Basic	\$19.25 to \$20.00
Bessemer	20.00
Gray forge	20.00
No. 2 foundry	21.00
No. 3 foundry	20.50
Malleable	20.00

Ferroalloys.—American makers of ferromanganese are meeting English competition. We note the sale of 100 tons of 78 to 82 per cent domestic material to a West Virginia steel maker at \$65.25 delivered, as compared with \$70, the price on the last previous sale. This price was above the delivered price of English material, which at \$58.35 c.i.f. Atlantic seaboard, would mean \$63.55 delivered, Pittsburgh district. The Trumbull Steel Co., Warren, Ohio, seeks 100 tons of 80 per cent ferromanganese for October delivery. There is no reason to quote other than minimum prices in a dull market like the present one. Melters do not seem interested in spiegeleisen and the only sale recently noted in 50 per cent ferrosilicon was a carload to a Pittsburgh steel foundry interest at \$60, furnace, freight allowed.

We quote 78 to 82 per cent domestic ferromanganese at \$65 delivered; 76 to 80 per cent, \$68; 78 to 82 per cent British ferromanganese, \$58.35, c.i.f. Atlantic seaboard. We quote average 20 per cent spiegeleisen at \$30 to \$32, delivered, Pittsburgh or Valleys; 50 per cent ferrosilicon, domestic, \$60, freight allowed. Bessemer ferrosilicon is quoted f.o.b. Jackson and New Straitsville, Ohio, furnaces as follows: 10 per cent, \$36.50; 11 per cent, \$39.80; 12 per cent, \$43.10; 13 per cent, \$47.10; 14 per cent, \$52.10; silvery iron, 6 per cent, \$25; 7 per cent, \$26; 8 per cent, \$27.50; 9 per cent, \$29.50; 10 per cent, \$31.50; 11 per cent, \$34; 12 per cent, \$36.50. The present freight rate from Jackson and New Straitsville, Ohio, into the Pittsburgh district is \$4.06 per gross ton.

Billets, Sheet Bars and Slabs.—Although actual business still is of moderate proportions, interest on the part of consumers in the market is keen, evidence of which is found in rather numerous inquiries. Generally, makers are not disposed to sell sheet bars at less than \$30, but a large Eastern maker is said to have cut substantially below this figure and one other maker, competing for business, has met the lower price, which, it is understood, was \$28. We note the sale of a fair sized tonnage of forging billets at \$35, Pittsburgh, but nothing of importance recently has been done in rerolling billets, nor in slabs. The latter forms generally are held at \$30.

We quote 4 x 4 in. soft Bessemer and open-hearth billets at \$29 to \$30; 2 x 2-in. billets, \$30; Bessemer and open-hearth sheet bars, \$30; slabs, \$30; forging billets, ordinary carbons, \$34 to \$35, all f.o.b. Youngstown or Pittsburgh mills.

Wire Rods.—Demand still is rather limited despite the somewhat livelier market in wire products, and while all makers now are quoting \$41, Pittsburgh, for the base size of soft rods, no claim yet is made that this price has been established by considerable sales. However, none of the makers is willing to consider less than \$41 now. Chain makers are specifying fairly well, but demands from rivet manufacturers still are few and small. Prices are given on page 772.

Steel Skelp.—Very little demand exists for either pipe or boiler tube skelp and prices are merely nominal. On the latter grade, some makers still are talking 1.90c., but there have been no sales recently at that price. On pipe skelp, the common asking price is 1.75c., but quotations of 1.70c. have failed to bring orders and with sheared plates available at 1.65c. the common belief is that skelp will have to go that low to interest buyers.

Structural Material.—The American Bridge Co. has taken 4200 tons for the addition to the department store of the Joseph Horne Co., Pittsburgh, and 1800 tons for 16 Government river barges. This company also will fabricate and erect 100 tons for an addition to the plant of Wyckoff Drawn Steel Co., Ambridge, Pa. The McClintic-Marshall Co. reports taking 525 tons for the Southard Street viaduct, Trenton, N. J., and 355 tons for a new building for the Bell Telephone Co., Scranton, Pa. The Jones & Laughlin Steel Co. has taken 100 tons for a new building for the Walmer Hardware Co., Wilkinsburg, Pa. Competition for structural awards still is extremely sharp and the price advantage entirely with investors. If no consideration is given overhead and other charges, the bids against some projects would indicate a plain material base considerably below current quotations. Plain material is in somewhat better demand as the result of recent awards, but there is room for considerable improvement. The common quotation on structural beams is 1.65c., Pittsburgh. Prices are given on page 772.

Iron and Steel Pipe.—Effective Sept. 16, the National Tube Co. reduced quotations on all kinds of steel tubular products. In standard pipe and line pipe, the reduction, as compared with the July 7 card of the company was \$8 per ton on butt weld and \$8 to \$10 per ton on lap weld. The company in the latest card makes a change in the size brackets on lap weld pipe. In the July 7 card, 7-in. to 12-in. pipe took the same discount, but in the new card, 7-in. to 8-in. pipe is quoted at one discount and 9-in. to 12-in. pipe at another. New prices on oil well casing, tubing and drive pipe also are down \$8 to \$10 a ton. On large outside dimension pipe for large oil and gas lines, the reduction runs from \$10 per ton in the larger sizes to \$14 per ton in the smaller sizes. There has been a rebracketing of sizes of water well casing, the smaller sizes holding at the July 7 discounts, while sizes from 4¼-in. up have been reduced from \$9 to \$25 per ton. Independent makers quite generally have adopted the new card. The new prices more than absorb any concessions from the July 7 card which have been made on standard pipe, but do not approximate the prices which have been named against recent inquiries for line pipe, in which, in markets like the present one, very low prices, usually come out because of the large lots ordinarily sought and the eagerness of makers for such business. So far, there has been no change in wrought iron pipe, which was reduced \$10 to \$12 per ton by leading makers on Sept. 1. Business in standard pipe is fairly good, but could be much better than it is in old country goods. Line pipe inquiries are fairly numerous and a few are for good sized tonnage. Discounts are given on page 772.

Nuts, Bolts and Rivets.—New demands are few, but makers are getting a larger number of specifications against old orders than was the case recently. Price cutting is less severe and quotations mean a little more than they did recently. Prices and discounts are given on page 772.

Iron and Steel Bars.—Activity still is lacking in merchant steel bars and prices are rather poorly defined. Some makers still are asking 1.75c., but this is at least \$2 per ton above the price ideas of buyers, and some are not willing to go even that high, in view of the reports from other centers of business being done at a lower figure. These, who may have big tonnages to place later, regard 1.50c., base, as the ultimate level, but tonnages which might develop such a price are lacking at the moment. Small lot business generally is being done at 1.65c. to 1.70c., and this also is the range on concrete reinforcing bars. Makers of iron bars are disinclined to consider less than 2.25c. for so-called refined iron bars.

We quote steel bars rolled from billets at 1.65c. to 1.70c. reinforcing bars, rolled from billets, 1.60c. to 1.70c. base, reinforcing bars, rolled from old rails, 1.60c.; refined iron bars, 2.25c. in carloads, f.o.b. mill, Pittsburgh.

Spikes.—There is a fair run of orders for small lots of standard spikes, the railroads merely taking on such supplies as they actually need. The general asking price is \$2.50 base, per 100-lb., but this has become

more of an asking than a selling price, because competition has developed a quotation as low as \$2.40 and this is the basis of most sales. Similarly, \$2.75 base is asked for small spikes and bolts and barge spikes, but the more common selling price is \$2.65. Prices are given on page 772.

Steel Rails.—Light sections rolled from billets still are generally quoted at 1.75c. base, but this is largely an asking price because the demand is very limited and there is no question that a concession of \$1 and possibly \$2 per ton would be made on anything like an attractive inquiry. Requirements of both the contractors and the coal mines, at the moment, appear to be small. Specifications against orders for standard rails are better this month than they were in August, but in view of the fact that not much time remains between now and winter for laying rails and that the railroads have considerable tonnage due them on old orders, it is probable that there will be a considerable carry over of 1921 business into 1922.

We quote 25 to 45-lb. sections, rolled from new steel, 1.75c.; rolled from old rails, 1.60c.; standard rails, \$45 mill for Bessemer and \$47 for open-hearth sections.

Wire Products.—The common report is that both jobbers and manufacturers now are specifying promptly against their orders and that business is more satisfactory than it has been at any previous time this year. However, most of the shipments carry the prices in effect prior to Sept. 12. Sales of nails at \$2.90 base per keg have not been numerous, nor have they involved very large quantities, but makers are adhering to the new base.

We quote wire nails at \$2.90 base per keg, Pittsburgh, and bright basic and Bessemer wire at \$2.60 base per 100 lb., Pittsburgh.

Sheets.—Recent action of several independent makers in advancing prices \$5 per ton appears to have stimulated buying for the reason that the American Sheet & Tin Plate Co., which has not yet followed the advance, this week is scheduling 70 per cent of its sheet mills which compares with 52 per cent last week and about 35 per cent a month ago. Youngstown district independents also are operating about 70 per cent this week. A number of independent makers have followed the lead of the Brier Hill Steel Co. in marking up prices \$5 per ton, but a number of others are waiting on the American Sheet & Tin Plate Co. to take this step and that company is expected to make the advance. In holding to the bases of 2.75c. for black, 3.75c. for galvanized and 2.25c. for blue annealed, the leading interest is stipulating that orders taken at these prices are for shipment at its convenience and that its prices for contract or forward deliveries are \$5 per ton higher. The Inland Steel Co. is making a double quotation on blue annealed sheets, quoting 2.25c., base, on the heavier gages and 2.50c. on the lighter. Prices are given on page 772.

Tin Plate.—The report still is one of an urgent demand for early shipment and no weakening in prices. There have been reports that production plates have sold at \$5 per base box, Pittsburgh, but so far as the American Sheet & Tin Plate Co. is concerned the price still is \$5.25 and independents in this and nearby districts deny having shaded this quotation, at least on domestic business. On export sales it is admitted that orders have been taken as low as \$4.50, this price having been dictated by Welsh competition. Stock items are reported to be pretty well liquidated and most makers now will not consider less than \$4.75 per base box for such material. Operations are holding up well. The American Sheet & Tin Plate Co. schedule for this week calls for the operation of 52 per cent of its mills, while McKeesport Tin Plate Co. is running all of its 44 mills, the Jones & Laughlin Steel Co. 50 per cent, and the Wierton Steel Co. 39 of its 50 mills, or almost 80 per cent. The latter company yesterday started up eight mills at its Clarksburg, W. Va., plant.

Cold-finished Steel Bars and Shafting.—Orders for both screw stock and shafting have shown some increase in the past week, but the market still is a long way from being active. Plant operations range anywhere from 10 to 50 per cent of capacity with most makers nearer the lower than the higher figure. In-

dependent makers generally are quoting 2.40c. base, Pittsburgh, for cold-rolled or drawn screw stock and shafting and are getting this price in most districts. The American Steel & Wire Co., however, is quoting 2.35c. and independents are meeting this price in competitive districts. Ground shafting still is quoted at 2.75c. base, mill.

Plates.—Demand still is limited and there is no special change in the general situation except that possibly makers are a little less eager for business carrying a price of less than 1.65c., than they were recently. There is no money even in large tonnages at that price, and the number of mills which will take business at that figure is smaller than it was recently.

We quote sheared plates, ¼ in. and heavier, tank quality, at 1.60c. to 1.70c. f.o.b. Pittsburgh.

Boiler Tubes.—A new card dated Sept. 16, of the National Tube Co., reduces prices of all sizes of lap weld steel tubes \$10 per ton and this cut has been followed generally by other makers. The National Tube Co. has not yet resumed issuing public quotations on seamless boiler tubes. No change has been made yet in discounts on charcoal iron boiler tubes, but one is expected shortly, not only because of the cut in steel tubes but because iron tubes were not cut when iron pipe declined Sept. 1. Demand is slow for all kinds of tubes, but particularly for iron tubes, due to the relatively high prices. Discounts are given on page 772.

Hoops and Bands.—A rather determined effort is now being made to restore the recent base of 2.25c. for both hoops and bands. As far as cooperage requirements are concerned, practically all makers now are quoting this price, but on the heavier gage which can be rolled on bar mills, competition is being encountered and there remains some basis for a price of 2c.

Hot-Rolled and Cold-Rolled Strips.—Less tendency to cut prices is noted, and while sales of hot-rolled strips carrying a price of 2c., and in cold-rolled strips at 3.75c., have not entirely ceased, the more common quotations now are 2.25c., base, for hot-rolled and 4c., base, for cold-rolled strips. It is probable that mills which have been naming the low prices will withdraw them shortly because of the big losses they spelled.

Cut Nails.—Public quotations still are 3c., base, at mill for carloads and 3.10c. for less than carloads, but on carload business 2.90c. has been done and on really attractive orders 2.75c. would not be turned down without consideration. Demand in this district is moderate.

Coke and Coal.—The market is no stronger and possibly is slightly weaker than it has been. Inquiries against the prospective lighting up of a number of idle blast furnaces have almost petered out and now that labor troubles in the Connellsville district appear to have been amicably adjusted, there is not the anxiety for spot tonnages there was last week and the week before. The A. M. Byers Co. will blow in its Mattie furnace, Girard, Ohio, Oct. 1, and has contracted for 15,000 tons of coke per month for four months, beginning Oct. 1. The business did not go to any of the Connellsville district operators and the common assumption is that the coke will be provided from a steel works by-product plant. Details as to prices are not available. Furnace coke still is quotable from \$3.25 to \$3.50 per net ton, oven, but the market is not as firm at those prices this week as it was last week. Foundry coke finds a steady demand at about the same prices as a week ago, although it is claimed that on some recent business as much as \$4.75 has been obtained. The coal market is quotable from \$1.75 to \$2 for mine run steam, \$1.85 to \$2 on mine run by-product and \$2.25 to \$2.75 for mine run-non-union gas.

Old Material.—Trend of prices still is upward, though there is little apparent activity by melters. Quietly, however, they are putting out inquiries, while a number of high-priced contracts are being readjusted, the melters taking on additional tonnages at a price which brings down the average. Dealers lacking supplies sufficient to meet their contracts in steel works grades are showing some anxiety to cover them.

(Continued on page 775)

Chicago

CHICAGO, Sept. 20.

The feature of the steel market during the past week was an advance of \$5 a ton on black and galvanized sheets by independent mills and a reduction of from \$8 to \$10 a ton on steel pipe by the National Tube Co. During the days of grace allowed to customers by the sheet mills, heavy purchases were made at the old prices with the result that producers have accumulated substantial backlogs sufficient, in some cases, to keep their capacity busy for from two to three months. Jobbers have covered on sheets just as they covered when wire and nails were advanced, and it is interesting to note that they are also taking a livelier interest in bolts and nuts notwithstanding the fact that discounts are still soft.

Cast-iron pipe continues to move in fairly good volume, and prices, particularly on the smaller sizes, are stiffening. In the heavier steel commodities, plates, structurals and bars, there are as yet no signs of price stability and the situation appears to be reaching the point where mills will find it cheaper to shut down their capacity and take the overhead loss chargeable to their idle equipment rather than continue to take business at going prices. One local producer, in fact, has had its plate mill idle for over a fortnight, and is disinclined to resume operation until prices advance to a point which will permit it to roll steel without incurring a heavy loss.

New business in pig iron is light, but specifications against contracts are coming in more freely, being received in some instances from melters who had not authorized shipments for seven months.

Mill operations in this district show a slight gain. The Inland Steel Co. is now on a 30 per cent basis, while the operations of the Illinois Steel Co. reached 36 per cent the middle of last week only to decline again to 30 per cent.

Pig Iron.—There are few new inquiries or orders of size to report, but specifications against contracts are coming in more freely. In some cases, melters who have not specified for seven months are asking for shipments. The exhaustion of melters' yard stocks probably accounts for the recent rebound of the market to a larger degree than increased operations. While it is undeniable that melt in this district is appreciably larger than a month or two ago, the situation among foundries is decidedly spotty. With some exceptions, intermittent operation seems to be the rule. With the receipt of orders for castings, the melter is led to believe that the turn has come, only to find himself without work a week or two later. A Milwaukee sanitary manufacturer has bought 600 tons of resale Southern foundry, 2.75 to 3.25 per cent silicon, at a flat price of \$25 delivered. An inquiry for 200 tons of low phosphorus is current. Reports from the South indicate that furnace output there is on the increase. One merchant furnace was recently blown in and two others are scheduled to go in in the near future. One Southern producer is now quoting on first quarter business at the present price of \$19. base, Birmingham. Beehive foundry coke is growing firmer, the minimum quotation now being \$4.50, Connellsville, with some producers holding at \$4.75.

Quotations on Northern foundry, high phosphorus malleable and basic irons are f.o.b. local furnace and do not include a switching charge averaging 70c. per ton. Other prices are for iron delivered at consumers' yards, or when so indicated, f.o.b. furnace other than local.

Lake Superior charcoal, averaging sil.	
1.50, delivered at Chicago.....	\$33.50
Northern coke, No. 1, sil. 2.25 to 2.75.	22.50
Northern coke, foundry, No. 2, sil.	
1.75 to 2.25.....	22.00
Northern high phos.....	22.00
Southern foundry, sil. 1.75 to 2.25....	25.67
Malleable, not over 2.25 sil.....	22.00
Basic	22.00
Low phos., Valley furnace, sil. 1 to 2	
per cent copper free.....	\$34.50 to 35.50
Silvery, sil. 8 per cent.....	32.82

Ferroalloys.—The reduction of foreign ferromanganese to \$58.35, seaboard, brings the local delivered price down to \$66.75. Two local sales of about 100 tons each have been made by domestic producers at this

price, and an inquiry for 200 tons for Chicago delivery has just been issued. A number of carload inquiries for spiegeleisen are current. Some local steel mills are releasing shipments against alloy contracts. A large Chicago user is reported to have bought a car of 50 per cent ferrosilicon at less than \$62, delivered.

We quote 78 to 82 per cent ferromanganese, \$66.75 to \$75 delivered; 50 per cent ferrosilicon, \$62.50 to \$65 delivered; spiegeleisen, 18 to 22 per cent, \$36 to \$37 delivered.

Railroad Equipment.—The Chicago, Milwaukee & St. Paul has let repairs of 100 composite gondola cars to the Western Steel Car & Foundry Co. The Pittsburgh & Lake Erie has awarded repairs on 1000 freight cars to the Standard Steel Car Co. The American Refrigerator Transit Co. is considering the repair of 100 refrigerator cars.

Structural Material.—Although some craftsmen have returned to work, the local building situation remains unsettled and it is still strongly felt in some quarters that the only solution is the introduction of the open shop. In the meantime, uncertainty is holding back much projected work. Structural activity in other sections of the West is of a more encouraging character and mills report a slow increase in their bookings in plain material. An accumulation of orders has permitted the Inland Steel Co. to resume the operation of its 28-in. structural mill. Much of the current fabricating work is small, involving from 20 to 100 tons per job. The largest pending project, the Government hangar at Belleville, Ill., involving 3600 tons, has been advanced another step towards construction through the taking of bids on the general contract. The W. M. Sutherland Building & Construction Co., St. Louis, is low bidder. Notwithstanding the trend towards betterment, the volume of current construction work is not yet sufficient to change the broad aspects of the market. Competition between fabricators is still very keen and plain material prices are soft. Fabricating awards include:

Standard Oil Co., 50 stills, Whiting, Ind., 1500 tons, to Petroleum Iron Works.

Consolidated Water Co., power house, Biron, Wis., 114 tons, to unnamed fabricator.

Michigan Lumber, Land & Iron Co., owned by Henry Ford, automobile body plant, Iron Mountain, Mich., 250 tons, to Worden-Allen Co.

Unlon Saw Mill Co., Huttig, Ark., conveyors, 125 tons, to Worden-Allen Co.

Evansville, Indianapolis & Terre Haute Railroad, bridge over Eel River, 200 tons, to Mount Vernon Bridge Co.

Prospective business includes:

Great Northern Railroad, single track draw span bridge, State of Washington, 530 tons, bids taken Sept. 19.

Huntington-Ohio Bridge Co., toll bridge, Huntington, W. Va., 4000 tons of structural as well as reinforcing steel, plans being prepared by C. A. P. Turner Co., Minneapolis.

The mill quotation on plain material ranges from 1.80c. to 1.85c., Chicago. Jobbers quote 2.88c. for materials out of warehouse.

Rails and Track Supplies.—Railroad orders for standard spikes and track bolts are numerous, but small, ordinarily ranging from 500 to 1000 kegs each. The largest individual order reported is 2500 kegs of spikes bought at 2.40c., Pittsburgh. Inquiries for tie plates are negligible, but there is a slight improvement in the demand for light rails.

Standard Bessemer rails, \$45; open-hearth rails, \$47; light rails rolled from new steel, 1.75c. f.o.b. makers' mills.

Standard railroad spikes, 2.40c., Pittsburgh; track bolts with square nuts, 3.40c., Pittsburgh; tie plates, steel and iron, 2c. f.o.b. makers' mills.

Plates.—Demand has not recovered sufficiently to give any semblance of stability to the market. Prices still vary widely, extreme concessions being made whenever a large inquiry of attractive specifications appears. A local mill will furnish about 2000 tons, principally plates, for 15 oil tanks at Humboldt, Kan., the fabricating award of which was noted last week. A price of 1.60c., Chicago, is reported to have been quoted on this tonnage, but confirmation is lacking. Present going prices are so unsatisfactory that one local interest which recently shut down its plate mill has determined not to resume operation until business can be booked without loss. Railroad car repair work is steadily gathering momentum and constitutes the chief feature

of the plate market. While many roads seem disposed to let repairs to car builders, a few lines have materially increased their own shop operations. The Burlington is reported to have eight shops running full.

The ruling mill quotations range from 1.75c. to 1.85c., Chicago. Jobbers quote 2.88c. for plates out of stock.

Bolts and Nuts.—Although demand is still far from satisfactory, jobbers are buying more freely than heretofore and prices are showing some signs of firmness. Among manufacturing consumers, the automobile plants are still foremost. Their operations, however, have fallen off somewhat during the current month with the result that purchases of bolts and nuts have been scaled down accordingly. The output of the leading maker of cheap cars is said to have decreased 15 per cent. This company, however, is in the market for from 12,000,000 to 15,000,000 nuts as well as a quantity of bolts for October requirements. For mill prices, see finished iron and steel f.o.b. Pittsburgh, page 772.

Jobbers quote structural rivets, 3.68c.; boiler rivets, 3.75c.; machine bolts up to $\frac{3}{8}$ x 4 in., 60 per cent off; larger sizes, 55 off; carriage bolts up to $\frac{3}{8}$ x 6 in., 55 off; larger sizes, 50 and 5 off; hot pressed nuts, square and hexagon tapped, 53 off; blank nuts, 33.25 off; coach or lag screws, gimlet points, square heads, 60 per cent off. Quantity extras are unchanged.

Bars.—Little tonnage in mild steel bars is coming on the market and most new business is in small lots. Prices are still irregular, going quotations ranging from 1.75c. to 1.95c., Chicago mill, depending on the size of the inquiry and the desirability of the specifications. Demand from manufacturers continues light and reinforcing jobs are not so numerous as some time ago. Considerable local work is still being held in abeyance because of the uncertain building situation. The Kalm Construction Co. has been awarded 200 tons for a bank at Sheboygan, Wis., and the Corrugated Bar Co. has the contract for 125 tons for a sewage disposal plant at Indianapolis. Demand for bar iron is at a low ebb and mill operations are intermittent. Mills rolling rail carbon steel bars are on a somewhat more satisfactory basis, although orders are still far below normal.

Mill prices are: Mild steel bars, 1.75c. to 1.90c., Chicago; common bar iron, 1.75c., Chicago; rail carbon, 1.75c., mill or Chicago.

Jobbers quote 2.78c. for steel bars out of warehouse. The warehouse quotation on cold-rolled steel bars is 4.20c. for rounds and 4.50c. for flats, square and hexagons. Jobbers quote hard and medium deformed steel bars at 2.53c., base.

Sheets.—The Inland Steel Co. last week announced advances of \$5 a ton on black and galvanized, bringing the former up to 3c. and the latter up to 4c., base Pittsburgh. This action was followed by most other independents and in the days of grace allowed by the mills buyers hastened to cover their needs for some time ahead. The American Sheet & Tin Plate Co. has not yet advanced. The Inland company is now operating all of its hot mills and is booked ahead until the latter part of December. Other mills likewise have accumulated substantial backlogs. Notwithstanding the changed complexion of the sheet market, many buyers continue to press the mills with inquiries calling for prompt shipment, often setting definite dates of shipment which cannot possibly be observed. Jobbers and roofing manufacturers have been especially prominent in the current buying movement, although purchases have been widely distributed. There has been no change in the price of blue annealed, as competition from mills rolling light plates is an obstacle to any tendency toward firmness.

Mill quotations are 2.75c. to 3c. for No. 28 black, 2.25c. for No. 10 blue annealed and 3.75c. to 4c. for No. 28 galvanized, all being Pittsburgh prices, subject to a freight to Chicago of 35c. per 100 lb.

Jobbers quote: Chicago delivery out of stocks, No. 10 blue annealed, 3.38c.; No. 28 black, 4.15c.; No. 28 galvanized, 3.75c. Hoops and bands, 3.48c.

Wire Products.—Buying is still active, but purchases at the new prices are mainly in small lots for prompt shipment. Some jobbers have covered their needs for a month or two ahead, but on the whole buyers are not piling stocks. Railroad purchases are still of the hand-to-mouth variety. Mill operations are rapidly improving as a result of the increased demand. For mill prices see finished iron and steel, f.o.b. Pittsburgh, page 772.

We quote warehouse prices f.o.b. Chicago: No. 9 and heavier black annealed wire, \$3.48 per 100 lb.; No. 9 and heavier bright basic wire, \$3.63 per 100 lb.; common wire nails, \$2.63 per 100 lb.; cement coated nails, \$3.05 per keg.

Cast Iron Pipe.—Pipe shops are well booked in sizes ranging from six to 10-in. with the result that prices are firmer. No bids of less than \$33.50, Birmingham, on those sizes are reported, and some makers are adhering to a minimum of \$34. Negotiations on 3800 tons for Hammond, Ind., are approaching a conclusion. The United States Cast Iron Pipe & Foundry Co. is the only bidder on 1700 tons of 60-in. for Cleveland. The opening of bids on 300 tons at Forest, Ohio, was postponed until Sept. 23. The Lynchburg Foundry Co. is low bidder on 450 tons for Spring Wells, Mich.

Recent lettings include:

Decatur, Ill., 400 tons, to National Cast Iron Pipe Co. St. Paul, 175 tons, to Glamorgan Pipe & Foundry Co. North Platte, Neb., 940 tons, to Colorado Fuel & Iron Co. Sidney, Ohio, 300 tons, to James B. Clow & Son. Springfield, Ohio, 80 tons, to United States Cast Iron Pipe & Foundry Co.

We quote per net ton, f.o.b. Chicago, ex-war tax, as follows: Water pipe, 4-in., \$45.60 to \$47.10; 6-in. and above, \$42.60 to \$44.10; class A and gas pipe, \$3 extra.

Warehouse Prices.—Lap-weld and seamless boiler tubes have been marked down, the reduction on 4-in. lap-weld being from the former price of 40c. a foot to 36½c., while the reduction on 4-in. seamless was from 57c. to 47c. per foot. Prices on charcoal iron tubes remain unchanged.

Old Material.—Limited consumptive demand still characterizes the market. A steel mill bought about 1000 tons of heavy melting at \$11.75 per gross ton delivered, while an iron mill paid \$12 a net ton for 1000 tons of No. 1 railroad wrought. Aside from these purchases, there has been little buying by users. A growing demand for car wheels is noted, but on the other hand cast and malleable grades, which were comparatively active in recent weeks, are now dull. Sellers continue to buy railroad material, but are not bidding prices up as actively as heretofore. Some advances are noted in the quotations below, but on the whole the market has undergone little change. Railroad offerings include: The Rock Island, 3800 tons; the Elgin, Joliet & Eastern, 625 tons, and the Chicago Great Western, 500 tons.

We quote delivery in consumers' yards Chicago and vicinity, all freight and transfer charges paid, as follows:

Per Gross Ton	
Iron rails	\$16.00 to \$16.50
Relaying rails	27.50 to 30.00
Car wheels	14.00 to 15.00
Steel rails, rerolling	13.00 to 13.50
Steel rails, less than 3 ft.	12.50 to 13.00
Heavy melting steel	11.50 to 12.00
Frogs, switches and guards cut apart	11.50 to 12.00
Shoveling steel	11.00 to 11.50
Low phos. heavy melting steel	13.25 to 13.75
Drop forge flashings	7.00 to 7.50
Hydraulic compressed sheet	7.50 to 8.00
Axle turnings	8.00 to 8.50

Per Net Ton	
Iron angles and splice bars	14.00 to 14.50
Steel angle bars	11.00 to 11.50
Iron arch bars and transoms	14.50 to 15.00
Iron car axles	18.50 to 19.00
Steel car axles	13.50 to 14.00
No. 1 busheling	9.00 to 9.50
No. 2 busheling	6.25 to 6.75
Cut forge	10.50 to 11.00
Pipes and flues	7.50 to 8.00
No. 1 railroad wrought	11.50 to 12.00
No. 2 railroad wrought	10.50 to 11.00
Steel knuckles and couplers	11.50 to 12.00
Coil springs	13.50 to 14.00
No. 1 machinery cast	13.50 to 14.00
No. 1 railroad cast	13.00 to 13.50
Low phos. punchings	11.50 to 12.00
Locomotive tires, smooth	11.00 to 11.50
Machine shop turnings	3.50 to 4.00
Cast borings	5.00 to 5.50
Stove plate	12.50 to 13.00
Grate bars	10.50 to 11.00
Brake shoes	11.00 to 11.50
Railroad malleable	13.00 to 13.50
Agricultural malleable	13.00 to 13.50
Country mixed	9.00 to 9.50

The K. & L. Radiator Co., Allentown, Pa., manufacturer of automobile radiators, has filed notice of change of name to the Mack-Landis Corporation.

The Autocar Co., Ardmore, Pa., manufacturer of automobile trucks, has arranged for a note issue of \$1,500,000. David S. Ludlam is president.

New York

NEW YORK, Sept. 20.

Pig Iron.—Of the inquiries for foundry and malleable iron reported pending last week, a wheel company in the St. Louis district has purchased about 3000 tons of Southern foundry iron and 800 tons from a St. Louis furnace, and it is expected that a Massachusetts machine company, which has been inquiring for 10,000 tons, will close before the end of the week. The General Electric Co. has bought about 2000 tons and sales amounting to from 2000 to 3000 tons have been made in the immediate New York district, including 750 tons of No. 2X for October delivery. Several inquiries for fair tonnages of high silicon iron, including one for 300 tons of 3 per cent silicon, are pending. In eastern Pennsylvania, \$19.50 furnace continues to be the minimum for No. 2 plain with \$19 for the same iron at Buffalo.

We quote delivered in the New York district as follows, having added to furnace prices \$2.52 freight from eastern Pennsylvania, \$5.46 from Buffalo and \$6.16 from Virginia:

East. Pa. No. 1 fdy., sil. 2.75 to 3.25..	\$23.02
East. Pa. No. 2X fdy., sil. 2.25 to 2.75	22.52
East. Pa. No. 2 fdy., sil. 1.75 to 2.25..	22.02
Buffalo, sil. 1.75 to 2.25.....	25.46
No. 2 Virginia, sil. 1.75 to 2.25 (nom.)	28.16 to 29.16

Ferroalloys.—The reduction in the price of British ferromanganese to \$58.35, seaboard, announced a week ago, has had its effect and the market has been more active than in many weeks. Sales are reported as totaling at least 1000 tons, most of it British alloy. Sales of the latter are reported to have been made at \$58.25, seaboard, or slightly under the price announced last week. Some domestic ferromanganese has been sold in competition with this price and the American makers are evidently willing to quote on the basis of the British seaboard price, the delivered price varying with the location of the consumer. Under the circumstances there is no definite domestic price, such as has prevailed recently, but generally it may be figured as the British quotation plus freight to the point of consumption. Besides the sales mentioned there is an inquiry for 125 tons from one consumer for early delivery. The spiegeleisen market is inactive, with prices unchanged. There is absolutely no demand for high-grade manganese ore, quotations for which are nominal. In view of the very considerable accumulations in this country, imports of manganese ore have fallen off sharply in recent months. The 50 per cent ferrosilicon market is inactive but steady. Quotations are as follows:

Ferroalloys

Ferromanganese, domestic, delivered, per ton,	\$60.00 to \$63.00
Ferromanganese, British, seaboard, per ton	\$58.35
Spiegeleisen, 20 per cent, furnace, per ton,	\$25.00 to \$26.00
Ferrosilicon, 50 per cent, delivered, per ton,	\$60.00 to \$65.00
Ferrotungsten, per lb. of contained metal, 48c. to 58c.	
Ferrochromium, 6 to 8 per cent carbon, 60 to 70 per cent Cr., per lb. Cr.....	14c.
Ferrovanadium, per lb. of contained vanadium	\$4.50

Ores

Manganese ore, foreign, per unit, seaboard..	20c.
Tungsten ore, per unit, in 60 per cent concentrates	\$3.00 up
Chrome ore, 40 to 45 per cent Cr ₂ O ₃ , crude, per net ton, Atlantic seaboard....	\$20.00 to \$25.00
Chrome ore, 45 to 50 per cent Cr ₂ O ₃ , crude, per net ton, Atlantic seaboard.....	\$30.00
Molybdenum ore, 85 per cent concentrates, per lb. of MoS ₃ , New York.....	55c. to 60c.

Finished Iron and Steel.—A slight improvement in demand for steel products is accompanied by weakness in prices, particularly on plates, shapes and bars. The advance of \$5 a ton on sheets by leading manufacturers, which was put into effect the latter part of last week, apparently is not general, as some companies have not notified their sales representatives here to make any changes. Thus the range in prices on sheets is from 2.25c. to 2.50c. on blue annealed, 2.75c. to 3c. on black and 3.75c. to 4c. on galvanized, all base Pittsburgh. Soft steel bars are now quoted from 1.50c. to 1.60c., Pittsburgh, the lower price applying usually to reinforcing quality, while plates and shapes have declined to 1.60c., Pittsburgh, and even this price does

not seem firm at the moment, though sales representatives of the steel companies are informing their customers that prices are "on the bottom." It is interesting to note that each month since May has shown a slight gain in structural steel work and the record for September will doubtless show a substantial gain over August. Included in this month's lettings is the Federal Reserve Bank, New York City, mentioned last week, requiring 14,000 tons of steel. The general steel contract was awarded to Post & McCord, New York, and the American Bridge Co. will roll and fabricate the steel. A number of large apartment houses for New York are being informally figured upon, including one at Riverside Drive and 110th Street and another at Broadway and Ninetieth Street. The Hedden Iron Construction Co. has been awarded 800 tons for an apartment house near Broadway and 110th Street. The American Bridge Co. was awarded 700 tons for a bridge between Troy and Cohoes, N. Y., also two buildings for the Driver-Harris Co., Harrison, N. J., totaling 200 tons. Bids went in Saturday on an interstate bridge at Trenton, N. J., requiring 500 tons. A warehouse for R. H. Macy & Co. at Thirty-sixth Street and Eleventh Avenue, New York, was awarded to the Levering & Garrigues Co., 1200 tons. The First National Bank, Richmond, Va., is in the market for an addition, 700 tons. Several other large projects which have been in the market for weeks are being indefinitely held up. Some very low prices are being made by fabricators, an example being a \$58 price for fabrication and erection of a warehouse, a beam and column job. Little of importance has developed in the way of general inquiry for steel products, most of the inquiries and orders being for small tonnages. The General Petroleum Corporation, 71 Broadway, New York, is inquiring for 1500 to 2000 tons of plates and smaller tonnages of angles, channels and bars for fabrication of plates. It is planned to ship the steel by boat from New York to California. Bids will possibly be received also on completely fabricated tanks. The Western Pacific Railroad is in the market for 1000 50- or 70-ton general service steel gondola cars. No new railroad repair work has come into the market.

We quote for mill shipments, New York, as follows: Soft steel bars, 1.88c. to 1.98c.; plates, 1.98c. to 2.03c.; structural shapes, 1.98c. to 2.03c.; bar iron, 1.98c. to 2.03c. On export shipments the freight rate is now 28.5c. per 100 lb., instead of 38c., the domestic rate.

Warehouse Business.—The number and size of transactions continue on a par with August business. Although no official changes have been made, except in pipe prices, there is less tendency to shade by the smaller warehouses. Galvanized sheets, No. 28 gage, are undoubtedly still obtainable at 4.75c. per lb., and within a week one transaction is reported at a price better than 4.50c. per lb., but the price is generally 5c. per lb. Small lots of blue annealed sheets, No. 10 gage, are reported as high as 3.53c. per lb., although the average quotation is 3.28c. per lb. The recent reduction of steel pipe by mills from \$8 to \$10 per ton has been followed by a warehouse reduction of from \$8 to \$12 per ton, which is expected to aid materially in stabilizing quotations, heretofore largely nominal. Brass and copper prices are unchanged since Sept. 1. The lowest quotations for these products on page 786 are the prices on medium and large-sized lots out of stock, while the higher prices are for small lots from warehouse. Dealers in old metals report a firmer tone and believe that, if it continues for a week or two longer, it may be considered as a permanent improvement. We quote prices on page 786.

High-Speed Steel.—Business is confined to a few small orders, although a majority of producers report a slight improvement this month. Quotations continue nominal at 90c. to \$1 per lb. for 18 per cent tungsten high-speed steel.

Cast-Iron Pipe.—No fresh municipal inquiries have come before the trade, though private buying continues satisfactory. Prices in this district are being held fairly firm, those who use the recognized proportions of pig iron and scrap claiming that lower prices cannot be made. We quote per net ton, f.o.b. New York, carload

lots, as follows: 6-in. and larger, \$47.30; 4-in. and 5-in., \$52.30; 3-in., \$62.30, with \$4 additional for Class A and gas pipe.

Old Material.—Some items have taken a slight raise the past week, though otherwise there is but little change. Dealers in this vicinity have their yards well stocked with material and it is expected to take considerable buying by mills to force the prices up markedly. The two principal items changing hands are heavy melting steel and No. 1 machinery cast, the latter item having risen in price. One eastern Pennsylvania mill is reported to have paid \$12.75 for choice heavy melting steel.

Buying prices per gross ton, New York, follow:

Heavy melting steel, yard.....	\$7.00 to \$7.50
Steel rails, short lengths, or equivalent.....	8.50 to 9.00
Revolving rails.....	11.50 to 12.00
Relaying rails, nominal.....	37.50 to 40.00
Steel car axles.....	11.00 to 11.50
Iron car axles.....	18.00 to 19.00
No. 1 railroad wrought.....	11.50 to 12.00
Wrought iron track.....	9.50 to 10.00
Forge fire.....	5.50 to 6.00
No. 1 yard wrought, long.....	10.00 to 10.50
Light iron.....	3.50 to 4.00
Cast borings (clean).....	5.50 to 6.00
Machine-shop turnings.....	3.50 to 4.00
Mixed borings and turnings.....	3.00 to 3.50
Iron and steel pipe (1 in. diam. not under 2 ft. long).....	8.50 to 9.00
Stove plate.....	9.50 to 10.00
Locomotive grate bars.....	10.00 to 10.50
Malleable cast (railroad).....	8.50 to 9.00
Car wheels.....	11.00 to 11.50

Prices which dealers in New York and Brooklyn are quoting to local foundries, per gross ton, follow:

No. 1 machinery cast.....	\$17.00 to \$18.00
No. 1 heavy cast (columns, building materials, etc.), cupola size.....	15.00 to 16.00
No. 1 heavy cast, not cupola size.....	14.00 to 15.00
No. 2 cast (radiators, cast boilers, etc.).....	9.50 to 10.50

Birmingham

BIRMINGHAM, ALA., Sept. 20.

Pig Iron.—Last week closed with Birmingham iron very firm at base of \$19, silicon 1.75 to 2.25. A few lots had been sold on a \$19.50 base by one maker, but \$19 was the rule. The \$19 base applies for all fourth quarter. One maker sold out on the 1000 tons of low silicon on yards and joined the galaxy of those with none. Another maker sold 850 tons in 11 lots in five days, all but 120 tons for prompt delivery. Two carloads brought \$19.50. The feature of the week was the reappearance of buyers from the Middle West. Evansville took three lots from one maker in the same day. Ohio points booked small lots and Louisville reappeared for a small tonnage. A sale of 500 to 700 tons in Chicago territory was made. It was 2.25 to 2.75 silicon and brought \$19.50. A proffer of 2000 tons at \$19.50 for the first 1000, which was to be 2.25 to 2.75 silicon, with same price for the second 1000, which was to be 3.25 to 3.75 silicon, was turned down. Following the advice of Southern makers, melters in the South are ordering fourth quarter requirements at \$19 and getting away from the hand-to-mouth system. A Southern pipe maker took 1500 tons during the week for October and November delivery. There are inquiries for other pipe tonnage. The stack of the Central Iron & Coal Co. at Holt resumed Monday after nearly a year of idleness. The company has no iron on yards. Indications point to a total of 60,000 tons of merchant iron on Alabama yards by Oct. 1. A small advance in price is regarded as coming soon.

We quote per gross ton f.o.b. Birmingham district furnace, as follows:

Foundry, sil. 1.75 to 2.25.....	\$19.00
Basic.....	18.00
Charcoal.....	35.00

Cast-Iron Pipe.—The high pressure pipe market is not active, although total bookings by Birmingham plants last week approximated 4000 tons, the National Cast Iron Pipe Co. getting 1000, United States Cast Iron Pipe & Foundry Co. 2500 and American Cast Iron Pipe Co. 600 tons of known bookings. The National Cast Iron Pipe Co. continues to operate at about capacity. The base is \$35 for 6 in., with larger sizes selling at shaded prices. Sanitary pipe is fairly active at the base of \$40 with \$30 extra heavy.

Coal and Coke.—Domestic coal is much brisker, due to the stimulation caused by rise in cotton prices, and steam coal users are more inclined to discuss future contracts. Standard foundry coke remains at a base of \$6.

Old Material.—Yard men are less inclined to take offers of the consumers and some are holding for higher prices. No. 1 cast is not as easily gotten at the quoted price as formerly and No. 1 steel is held \$1 higher than the quotation by some yards. A general marking up in another week if steel and iron remain as firm is expected. We quote per gross ton, f.o.b. yards, as follows:

We quote per gross ton f.o.b. Birmingham district yard as follows:

Steel rails.....	\$11.00 to \$12.00
No. 1 steel.....	10.00 to 11.00
No. 1 cast.....	15.00 to 16.00
Car wheels.....	15.00 to 16.00
Tramcar wheels.....	12.00 to 13.00
No. 1 wrought.....	13.00 to 14.00
Stove plate.....	9.00 to 10.00
Cast iron borings.....	6.00 to 7.00
Machine shop turnings.....	6.00 to 7.00

Boston

BOSTON, Sept. 20.

Pig Iron.—Business, current and prospective, is better. Prospective business aggregates all of 20,000 tons, including 10,000 tons No. 2 plain, fourth quarter shipment, from a heating appliance manufacturer; 1000 tons No. 2X and 1000 tons No. 1X, shipment over the rest of the year, from a textile machinery interest; and 500 tons No. 2X, last quarter shipment, from a machine tool interest. The remainder is made up of several hundred tons No. 1X from a Connecticut hardware manufacturer, and smaller tonnages, largely for silicon 2.25 to 2.75 and higher, from diversified interests. The largest sale reported this week is 2000 tons eastern Pennsylvania No. 2 plain, No. 2X and No. 1X at \$20 furnace base and regular differentials. A Maine melter took 150 tons eastern Pennsylvania No. 1X, nearby shipment, at \$21 furnace, and four 100-ton lots, high silicon and special analysis, sold without competition, mostly to Connecticut foundries, at private terms. A small amount of Virginia special analysis iron also figures in the week's sales. French, Belgian, Luxemburg, Lorraine and Sarre Region sand-cast pig iron, most of it high in manganese and sulphur, with silicon ranging from 0.8 to 4 per cent, is offered c.i.f. dock Boston, or ex-dock, duty paid. Eastern Pennsylvania furnaces are holding more firmly to the \$20 furnace base, with the tendency upward rather than downward. The report that the Robeson furnace has offered iron at \$19 furnace base is without foundation. The Buffalo market is firm at \$19.50 to \$20 base, and Southern and Virginia furnaces are not inclined to shade prices. A considerable tonnage on old contracts is being shipped into New England. Further readjustments on such contracts are reported. Delivered pig iron quotations follow:

East. Penn., sil. 2.25 to 2.75.....	\$24.56 to \$25.56
East. Penn., sil. 1.75 to 2.25.....	24.06 to 25.06
Buffalo, sil. 2.25 to 2.75.....	25.46 to 25.96
Buffalo, sil. 1.75 to 2.25.....	24.96 to 25.96
Virginia, sil. 2.25 to 2.75.....	29.08 to 32.08
Virginia, sil. 1.75 to 2.25.....	28.58 to 31.58
Alabama, sil. 2.25 to 2.75.....	30.16
Alabama, sil. 1.75 to 2.25.....	29.66

Coke.—Orders for by-product foundry coke booked the past week involve a larger tonnage than those for the corresponding period last month or for the previous week, but business is by no means active. A few of the largest New England foundries are melting as high as 200 tons daily, but a majority are doing very much less, and the average jobbing foundry is operating on a greatly reduced weekly schedule notwithstanding a general marking down of quotations on castings. Any increased buying of coke, therefore, appears to be based more on a desire to have stock on hand prior to the winter months than to any appreciable betterment in going business. The market for good grade Connellsville foundry coke is firmer at \$4 to \$4.50 on cars at ovens. Both the New England Coal & Coke Co. and the Providence Gas Co. are quoting on a basis of \$10.66 delivered.

Sand.—The market for molding sands is easier, quotations on good grades having been lowered about 25c. per ton, or from \$2 to \$1.75 on cars shipping point. The demand continues more or less restricted.

Finished Material.—Small structural tonnages are increasing, while large are decreasing. The McClintic-Marshall Co. is awarded 185 tons by Stone & Webster for a New York Steam Corporation plant addition, and the New England Structural Co. 102 tons for a Newton, Mass., theater. Bids are asked on 1500 tons for a First National Bank, Boston, building in Buenos Ayres. Stone & Webster are the engineers and York & Sawyer, New York, the architects. Bids will soon be asked on 500 tons for a Boston office building. The market on structural steel and plates is soft at 1.65c., Pittsburgh. The demand for steel products in general compares favorably with that noted during the latter part of August. The call for galvanized sheets is especially good just now. Warehouses have advanced wire nails 15c. per keg, and barbed wire and wire products in general in proportion. They report a slight improvement in the consumption of iron and steel and are less inclined to shade prices to secure business than heretofore.

Jobbers now quote: Soft steel bars, \$2.81½ per 100 lb. base; flats, \$3.83 to \$3.93; concrete bars, \$2.50 to \$3.09; tire steel, \$4.20 to \$4.70; spring steel, open hearth, \$5.25; crucible, \$11.50; steel bands, \$3.46½ to \$3.98; steel hoops, \$4.18; toe calk steel, \$5.25; cold rolled steel, \$4.15 to \$4.65; structural steel, \$2.81½ to \$2.96½; plates, \$2.91½ to \$3.10; No. 10 blue annealed sheets, \$3.73; No. 28 black sheets, \$4.75; No. 28 galvanized sheets, \$5.25; refined iron, \$2.83 to \$4.75; best refined, \$4.75; Wayne iron, \$7; Norway iron round, ¼-in. to 2½-in., 7.10c. per lb. net; other sizes, 7.75c. base.

Old Material.—Most New England foundries are still able to secure all the machinery cast needed at 65c. to 70c., delivered, from local yards. Yard interests in some instances allow foundries to pick out material wanted and quote one price on shipments extending over several weeks. Old material dealers, nevertheless, report more doing in car lots with the market about 50c. per ton higher on the inside. Stove plate is scarce and in some request, and the market has stiffened about 50c. On the other hand, railroad malleable, pipe, turnings and borings are dull and unchanged in price. Railroad wrought is firmer, due to increased inquiries, and slightly more interest is shown in forged scrap and bundled skeleton. Going business in steel is limited, but the market is firm in anticipation of early buying by Pennsylvania mills.

The following prices are for gross ton lots delivered consuming points:

No. 1 machinery cast.....	\$17.50 to \$20.00
No. 2 machinery cast.....	15.50 to 16.50
Stove plate.....	15.50 to 16.50
Railroad malleable.....	11.50 to 12.50

The following prices are offered per gross ton lots f.o.b. Boston rate shipping points:

No. 1 heavy melting steel.....	\$6.00 to \$6.50
No. 1 railroad wrought.....	10.00 to 10.50
No. 1 yard wrought.....	8.00 to 8.50
Wrought pipe (1-in. in diameter, over 2 ft. long).....	8.00 to 8.50
Machine shop turnings.....	2.50
Cast iron borings, rolling mill.....	3.50 to 4.00
Cast iron borings, chemical.....	4.00 to 4.50
Blast furnace borings and turnings.....	2.50 to 2.75
Forged scrap and bundled skeleton.....	4.50 to 5.00
Street car axles and shafting.....	12.00 to 13.00
Car wheels.....	12.50 to 13.50
Re-rolling rails.....	9.00 to 10.00

Cleveland

CLEVELAND, Sept. 19.

Iron Ore.—The several inquiries for small lots of ore ranging from 10,000 to 25,000 tons, which have come out recently, have not resulted in sales and ore men are doubtful whether they will lead to the placing of orders. The inquiries are from furnaces that have plenty of ore suitable for making steel making pig iron, but are considering making foundry iron provided they can buy the grades of ore they need cheap enough to permit them to make a profit with present pig iron prices. While a few small lot ore sales have been made in the past few weeks at concessions from regular prices, the most of these have been of ore classified as off grade, on which there is more or less price irregularity. In fact, it is claimed that only in one case has a price concession been made on standard ore, that being on some ore that had to be moved this season. However, the market has not been tested and a round

lot inquiry might bring out considerable price concession. Some resale ore is on the market on which the owners have not set a price, but are asking for offers. Present estimates are that the season's movement will not exceed 21,000,000 tons. A few weeks ago, the estimate was 25,000,000 tons. A falling off in shipments is expected early in October and the shipping season will close very early. Some of the Lake Superior docks will shut down Oct. 31 and one dock has advised that it will not start up its steaming plant, which means that it can be operated only a short time in November, as freezing weather usually necessitates the thawing of ore after about Nov. 10.

We quote delivered lower lake ports: Old range Bessemer, 55 per cent iron, \$6.45; Old range non-Bessemer, 51½ per cent iron, \$5.70; Mesabi Bessemer, 55 per cent iron, \$6.20; Mesabi non-Bessemer, 51½ per cent iron, \$5.55.

Pig Iron.—The demand for foundry iron appears to be slowly increasing. Sellers are getting more orders from diversified industries that have worked their stocks down to the point where they must replenish their supply. Sales during the week were fully equal in volume to any of the few previous weeks. Buying is nearly all in small lots and consumers are not contracting for delivery beyond the end of the year. September shipments will probably show some gain over August. There is virtually no change in the price situation. With lake furnaces, \$20 is still a common quotation for No. 2 foundry, although producers are making some sales at \$20.50 and \$21, the higher prices usually being charged when they have the advantage of freight rate. One Valley furnace continues to make sales at \$21 and another Valley producer advanced its price from \$20 to \$21 during the week. A Cleveland furnace made a local sale of 100 tons at \$21 Valley, or \$21.96 delivered, but \$20.50 to \$21 at furnace still generally represents the local market on foundry iron. We note the sale of 500 tons of basic iron by a Cleveland interest at \$19.25 Valley furnace for shipment from a western Pennsylvania furnace to a nearby consumer, this figuring back to a furnace price of about \$19.75. A local furnace sold 300 tons of malleable iron at \$20 furnace for shipment to Pittsburgh, or virtually on the basis of \$21 Valley furnace. One leading interest reports sales this month aggregating 15,000 tons. Another local interest sold from 6000 to 7000 tons during the week, including a 1000 ton lot of malleable and one 1000 ton lot of foundry iron. The General Electric Co. placed orders during the week for 1500 tons of Nos. 1 and 2 foundry iron for its Erie, Pa., plant. A Pittsburgh sanitary interest placed 400 tons of Southern iron with a Cleveland selling agency at \$19 base.

Quotations below are f.o.b. local furnace for northern foundry iron, not including a 56c. switching charge. Other quotations are delivered Cleveland, being based on a \$1.96 freight rate from Valley points, a \$3.36 rate from Jackson and a \$6.67 rate from Birmingham:

Basic.....	\$20.96
Northern No. 2 fdy., sil. 1.75 to 2.25.....	\$20.50 to 21.00
Southern fdy., sil. 2.25 to 2.75.....	26.17
Ohio silvery, sil. 8 per cent.....	30.86
Standard low phos., Valley furnace.....	35.00

Semi-Finished Steel.—An inquiry is pending for 5000 tons of slabs on which \$29, Youngstown, was quoted, but as the prospective purchaser did not immediately place the order, this quotation was withdrawn. The general quotation for slabs is \$30.

Finished Iron and Steel.—The finished iron and steel market shows a firmer tendency. Low prices were found to do little in increasing sales and mills are inclined to reduce losses by getting somewhat higher prices. The extreme weakness that recently developed in steel bars has evidently disappeared. One mill is credited with the sale of 1000 tons or more at a delivered price, including low cost water haul that figured back close to a 1.50c. Pittsburgh basis, but was understood to have withdrawn that price. The present minimum price on steel bars is evidently 1.60c. for desirable orders with 1.65c. the more common quotation. The minimum quotation on plates and structural material is 1.60c., but some mills are quoting these at 1.65c. to 1.75c. Plate mills in particular are showing more resistance to price concessions. Hard steel reinforcing bars are commonly quoted at 1.60c. The volume of new business during the week was rather light and no local inquiries for round tonnages came out. However, recent orders for

wire rods and products brought out some good specifications, including one for 1500 tons of wire rods. In Detroit the Ford Motor Co. took quotations on round lots of steel bars and sheets for October requirements. Increased activity is noted in the building field. The Republic Structural Iron Works Co. has taken the Glenville High School, Cleveland, requiring 150 tons of steel, and the Forest City Steel & Iron Co. has taken the Free Building, requiring 100 tons. Bids have been received for the Guarantee Security Discount Co. building, Akron, requiring 1000 tons, a bridge at West Palm Beach, Fla., requiring 1000 tons and the John Adams High School Building, Cleveland, requiring 300 tons. New bids have been received for the Masonic Temple, Detroit, requiring 7000 tons, but there is some uncertainty as to whether this steel will be placed immediately.

Jobbers quote steel bars, 2.64c.; plates and structural shapes, 2.74c.; No. 9 galvanized wire, 3.50c.; No. 9 annealed wire, 3.25c.; No. 28 black sheets, 3.75c.; No. 28 galvanized sheets, 4.75c.; No. 10 blue annealed sheets, 3.10c.; hoops and bands, 3.29c.; cold-rolled rounds, 3.85c.; flats, squares and hexagons, 4.35c.

Sheets.—Most independent mills have advanced sheet prices \$5 a ton to 3c. for black, 4c. for galvanized and 2.50c. for blue annealed. However, the advance on blue annealed sheets applies only to the lighter gages, as most mills are still quoting No. 12 gage and heavier at 2.25c. The advance brought out considerable business that consumers were given an opportunity to place before the new prices became effective. Automobile body sheets have been irregular for some time and several mills have reduced prices on these by cutting the differential from 2.10c. to 1.50c., making the present price for No. 22 gage 4.35c., based on a 3c. black sheet price. This compares with a recent 4.70c. price for automobile sheets.

Warehouse Business.—Jobbers have decided that for the present they will make no advance in warehouse prices on sheets, as they were able to replenish their stocks at the prices that prevailed before the advance.

Old Material.—The market is fairly active and firm with price advances on a few grades. Mills in the Valley district have made additional purchases of scrap and there is considerable demand from dealers for material to cover on these contracts. There is also a demand for scrap for Weirton and Canton delivery. The grades that are most active are compressed steel, borings and turnings. Sales of compressed steel are reported at \$10.85 for Youngstown and \$11.85 for Weirton delivery. Dealers are offering \$8 to \$8.25 for machine shop turnings for Valley shipment. Locally the demand continues very light, although one Cleveland mill is buying heavy melting steel to lay down in its yard, for which it is paying \$12.50, or possibly higher, and dealers are offering \$12.25 for this grade. Owing to some demand from the Youngstown district, flashings have advanced.

We quote per gross ton delivered consumers' yards in Cleveland and vicinity as follows:

Heavy melting steel.....	\$12.25 to \$12.75
Steel rails under 3 ft.....	12.75 to 13.25
Steel rails, re-rolling.....	14.25 to 14.75
Iron rails.....	11.00 to 12.00
Iron car axles.....	18.00 to 19.00
Low phosphorus melting scrap.....	12.50 to 13.00
Cast borings.....	7.25 to 7.75
Machine shop turnings.....	6.50 to 7.50
Mixed borings and short turnings.....	7.00 to 7.50
Compressed steel.....	8.25 to 8.50
Railroad wrought.....	12.00 to 12.50
Railroad malleable.....	12.00 to 12.75
Light bundled sheet stampings.....	4.50 to 5.00
Steel axle turnings.....	9.25 to 9.75
No. 1 cast.....	16.00 to 16.50
No. 1 busheling.....	7.50 to 8.00
Drop forge flashings, over 10 in.....	6.75 to 7.00
Drop forge flashings, under 10 in.....	6.75 to 7.00
Railroad grate bars.....	12.75 to 13.00
Stove plate.....	13.00 to 13.25
Pipes and flues.....	6.50 to 7.50

Coke.—The demand for foundry coke has increased to a considerable extent owing to the fact that many foundries are placing stock orders for small lots for winter requirements. The market is firm and several producers have advanced prices 25c. per ton. Quotations on best grades of standard Connellsville coke range from \$4.50 to \$4.75 per net ton at oven. We note the sale of 800 tons of Virginia foundry coke at \$6.

Bolts, Nuts and Rivets.—The improvement in the demand for bolts and nuts previously noted continues

and prices appear a little firmer. While sales are mostly in quite small lots, some of the manufacturers are getting a better volume of car lot orders. Plant operations have been increased somewhat. The demand for rivets continues very dull and prices are weak, with 2.25c. for structural and 2.35c. for boiler rivets the minimum quotations in this market.

Cincinnati

CINCINNATI, Sept. 20.

Pig Iron.—While there are no spectacular features, the market showed more activity during the past week, some fair-sized sales being reported. Some of these were made in cities outside of the Ohio River district, giving rise to the belief that industrial conditions in those cities are on the upgrade. One of these sales was for 1200 tons, and another for 500, both Southern iron, at \$19, base, Birmingham. In the Cincinnati district, the activity was not so pronounced, though we note a sale of 500 tons of malleable, and several 100-ton orders. A few inquiries are being figured on, one from the Louisville & Nashville Railroad being for 300 tons of Southern iron, and one from a Dayton melter for 150 tons. The price situation is stronger, and on the sale of malleable reported above, \$21.50, Iron-ton, was done. Foundry iron is held at \$21, and basic at \$20. The minimum in the South is \$19. Some interest is being shown in iron for first quarter, but furnaces are not quoting for other than immediate shipment. Tuscaloosa furnace in the South blew in to-day and Etna stack at Iron-ton Thursday last. The Alabama Co. will blow in one stack on Oct. 10.

Based on freight rates of \$4.50 from Birmingham and \$2.52 from Iron-ton, we quote f.o.b. Cincinnati:

Southern coke, sil. 1.75 to 2.25 (base)	\$23.50
Southern coke, sil. 2.25 to 2.75 (No. 2 soft)	24.00
Ohio silvery, 8 per cent sil.....	30.02
Southern Ohio coke, sil. 1.75 to 2.25 (No. 2)	23.52
Basic, Northern.....	22.52
Malleable.....	24.02

Finished Material.—The feature of the market during the week was the heavy booking of sheets. Local sales agents report that they were literally swamped with business and that orders were received from all sources. A particularly gratifying feature of the situation was the number of orders received from the Southern district. This is taken to indicate a big improvement in the general condition in the South. The reason for the heavy increase in business is probably the fact that the independent mills announced an advance of \$5 per ton on sheet prices, but allowed their customers to cover for 30 days' requirements at the old prices. Several offers to buy 1000 tons of sheets are reported, but the mills generally are only booking business for delivery six weeks ahead. Other lines of finished material are quiet and prices are, if anything, softer. On plates it is said that 1.65c. can be done even on moderate tonnages. Bars are being held at 1.70c. for car-load lots. On reinforcing bars, however, 1.50c., Pittsburgh, is being quoted by some re-rolling mills, and it is said that this price has also been made on new billet stock. Bookings of wire products slowed down somewhat during the week as most of the jobbers and manufacturers placed their orders before the price advances went into effect on Sept. 10. The only structural letting reported during the week was the Kellogg Avenue bridge at Cincinnati, involving 900 tons, which went to E. M. Sculley, Columbus, Ohio, at his bid of \$108,000. The only new project to come up was a 20-room school-house with an auditorium for the Board of Education at Richmond, Ky. Bids for this school will close with C. C. & E. A. Weber, architects, Cincinnati, on Oct. 5.

Warehouse Business.—Local jobbers are greatly encouraged as the result of an increased number of orders during the past week. Small lots for immediate shipment continue as the prevailing activity, but the number of orders received is much greater and the tonnages heavier. Jobbers in wire products continue to report good orders. Prices on nails will be advanced during the week to \$3.40 per keg, base, and on plain wire to 3.10c. per lb. In the lighter gages of blue annealed

sheets, an advance of \$2 per ton has been made. This applies to No. 14 and No. 16, No. 10 and No. 12 remaining the same as previously quoted.

Iron and steel bars, 3c. base; hoops and bands, 3.75c. base; shapes, 2.85c. base; plates, 2.85c. base; reinforcing bars, 3.07½c. base; cold rolled rounds, 1¼ in. and larger, 4.25c. under 1½ in. and flats, squares and hexagons, 4.75c.; No. 10 blue annealed sheets, 3.50c.; No. 28 black sheets, 4.25c.; No. 28 galvanized sheets, 5.25c.; wire nails, \$3.40 per keg base; No. 9 annealed wire, \$3.00 per 100 lb.

Coke.—The coke market is showing some activity, and while orders are confined to one and two car lots, the aggregate is fairly heavy. We note a sale of 100 cars of furnace coke, and 1300 tons of foundry outside this immediate district. Prices are stiffening, Connellsville coke being from 25c. to 50c. higher than last week. Wise County and New River coke are unchanged.

Tool Steel.—The market continues dull, although some improvement was noticed during the past couple of weeks. Prices show no change, high speed steel being quoted at from 85c. to 90c. per lb.

Old Material.—The United States Cast Iron Pipe & Foundry Co., Addyston, Ohio, is in the market for a heavy tonnage of cast scrap, and it is said will buy as much as 5000 tons if the price is right. Dealers report a scarcity of cast scrap and some of them have marked the price up another dollar per ton. A West Virginia steel plant is inquiring for borings and turnings. Local foundries, however, are not showing much interest in the market, although one of them has made an offer on 1000 tons of cast scrap which was turned down by the local dealers on account of the price being out of line.

We quote dealers' buying prices:

Per Gross Ton	
Bundled sheets	\$4.00 to \$5.00
Iron rails	12.00 to 12.50
Relaying rails, 50 lb. and up	25.00 to 26.00
Rerolling steel rails	10.50 to 11.50
Heavy melting steel	9.00 to 9.50
Steel rails for melting	9.00 to 10.00
Car wheels	11.50 to 12.50
Per Net Ton	
No. 1 railroad wrought	8.50 to 9.50
Cast borings	2.50 to 3.00
Steel turnings	2.00 to 2.50
Railroad cast	12.00 to 12.50
No. 1 machinery	13.50 to 14.50
Burnt scrap	7.50 to 8.50
Iron axles	15.00 to 16.00
Locomotive tires (smooth inside)	9.50 to 10.00
Pipes and flues	4.00 to 5.00

St. Louis

ST. LOUIS, Sept. 13.

Pig Iron.—Inquiries for pig iron are said to have slowed up a bit, following the recent advances, but the market is firm. Orders are being placed for immediate delivery, and buyers are insistent upon this, demanding car numbers as soon as possible. Buyers have been waiting as long as they could, and their stocks have run down to a low point. A local steel manufacturer took 600 to 800 tons of basic, and a nearby Illinois melter purchased 600 to 800 tons of foundry iron for prompt shipment. A Western consumer bought 500 tons. Negotiations are on for an order of 1500 to 1800 tons for shipment over the next 60 days. The recent advances in Northern irons have put them on a par in this market with Southern foundry, the market price being \$24.88, St. Louis, for the former, as against \$24.91 for the Southern product. So far there has been no buying of consequence of Southern foundry. Business among the stove manufacturers is increasing. There are inquiries out for a car each of ferromanganese and spiegeleisen.

We quote delivered consumers' yards St. Louis as follows, having added to furnace prices \$2.88 freight and war tax from Chicago and \$5.91 from Birmingham:

Northern foundry, sil. 1.75 to 2.25	\$24.88
Northern malleable, sil. 1.75 to 2.25	24.88
Basic	24.88
Southern foundry, sil. 1.75 to 2.25	24.91

Finished Iron and Steel.—St. Louis fabricators received with satisfaction the word from Washington that the lowest bidder on the airship hangar to be built at Belleville, Ill., by the Government was a St. Louis concern, the W. M. Sutherland Construction Co. About 3500 tons of structural steel is involved. The

Scottish Rite Cathedral contract, involving 3000 tons of structural steel, has been let to the John Hill Construction Co. Local fabricators were disappointed at the letting to Jones & Laughlin, Pittsburgh, of 600 tons for the Standard Underground Cable Co. plant at St. Louis. This order was reported in Chicago as having gone to the Decatur Bridge Co. Railroad requirements for the week were only a few carload orders. The Pennsylvania placed an order here for several hundred pounds of tool steel. Some weakness is reported in structural shapes and plates and bars, and some sales are being made at less than the market prices. There is a growing demand for sheets, especially on the part of local jobbers. Warehouse prices are unchanged.

For stock out of warehouse we quote: Soft steel bars, 2.87½c. per lb.; iron bars, 2.87½c.; structural shapes, 2.97½c.; tank plates, 2.97½c.; No. 10 blue annealed sheets, 3.47½c.; No. 28 black sheets, cold rolled, one pass, 4.10c.; cold drawn rounds, shafting and screw stock, 4.20c.; structural rivets, \$3.77½ per 100 lb.; boiler rivets, \$3.87½; tank rivets, 7/16 in. and smaller, 60-10 per cent off list; machine bolts, large, 55 per cent; small, 60 per cent; carriage bolts, large, 50-5 per cent; small, 55 per cent; lag screws, 60 per cent; hot pressed nuts, square or hexagon blank, \$3.25; and tapped, \$3.00 off list.

Coke.—The coke market is showing more strength, and standard Connellsville foundry coke is now quoted at \$5 per net ton at ovens. Orders for immediate shipment are increasing, and the situation generally is improved. In the last week 7500 tons of Granite City furnace coke was sold for shipment over the next 60 days. Business among the stove plants in the St. Louis industrial district is improving.

Old Material.—A few purchases of small tonnage were made during the week, but the market is comparatively quiet as far as demand for consumption is concerned. There is, however, considerable demand for No. 1 railroad cast scrap and stove plate. The mills still refuse to consider the recent advances in prices of heavy metalizing steel as permanent, and brokers are unwilling to make any concessions at present. The high-priced old material recently bought by the dealers from the railroads is now being shipped, and if the mills remain adamant, there probably will be a scramble among the dealers to unload at a loss. The following railroad lists are before the market this week: Chicago, Rock Island & Pacific, 3151 tons; Mobile & Ohio, 715 tons; Nashville, Chattanooga & St. Louis, 400 tons; Kansas City Southern, 150 tons; Wabash, 150 tons, and a list issued by the Southern Railway aggregating 9500 tons, very little of which will move in this market.

We quote dealers' prices, f.o.b. consumers' works, St. Louis industrial district and dealers' yards, as follows:

Per Gross Ton	
Iron rails	\$13.00 to \$13.50
Steel rails, rerolling	12.00 to 12.50
Steel rails, less than 3 ft.	11.00 to 11.50
Relaying rails, standard section	29.00 to 30.00
Cast iron car wheels	12.50 to 13.00
No. 1 heavy railroad melting steel	11.00 to 11.50
No. 1 heavy shoveling steel	9.50 to 10.00
Ordinary shoveling steel	9.00 to 9.50
Frogs, switches and guards, cut apart	11.00 to 11.50
Ordinary bundle sheet	4.00 to 4.50
Per Net Ton	
Heavy axle and tire turnings	6.00 to 6.50
Iron angle bars	11.00 to 11.50
Steel angle bars	9.00 to 9.50
Iron car axles	16.50 to 17.00
Steel car axles	12.50 to 13.00
Wrought iron arch bars and transoms	13.00 to 13.50
No. 1 railroad wrought	10.50 to 11.00
No. 2 railroad wrought	10.00 to 10.50
Railroad springs	10.50 to 11.00
Steel couplers and knuckles	10.50 to 11.00
Locomotive tire, 42 in. and over, smooth inside	9.00 to 9.50
No. 1 dealer's forge	6.00 to 6.50
Cast iron borings	5.50 to 6.00
No. 1 busheling	9.50 to 10.00
No. 1 boilers cut in sheets and rings	6.00 to 6.50
No. 1 railroad cast	13.50 to 14.00
Stove plate and light cast	11.50 to 12.00
Railroad malleable	10.00 to 10.50
Agricultural malleable	9.00 to 9.50
Pipes and flues	7.50 to 8.00
Heavy railroad sheet and tank	6.00 to 6.50
Light railroad sheet	3.50 to 4.00
Railroad grate bars	8.50 to 9.00
Machine shop turnings	4.50 to 5.00
Country mixed iron	7.00 to 7.50
Uncut railroad mixed	8.00 to 8.50
Horseshoes	10.50 to 11.00
Railroad brake shoes	8.50 to 9.00

Buffalo

BUFFALO, Sept. 20.

Pig Iron.—A decided falling off in inquiry and sales has affected producers in this district, and unless extraordinary tonnages are booked before the end of the month, September business will show a smaller movement of iron than the preceding month. There is evidence that a number of foundries are operating in a limited way, but their pig iron requirements are not up to expectations. This is attributed to the greater use of old material. Furnace operation has not changed. One producer is known to have stored almost 100,000 tons of iron. Its sales are limited and certainly not equal to the present production. Total inquiry in the hands of one interest for a week is less than 3000 tons—in contrast with the situation a week prior, when it was engaged with more than 20,000 tons. A producer sold about 1500 tons at \$20 base. Another sold nothing and notices a falling off in the small inquiry which has been fairly steady. An agency which demanded a price of \$21 base has sold but a few carloads.

We quote f.o.b. dealers' asking prices per gross ton Buffalo as follows:

No. 1 foundry, 2.75 to 3.25 sil.	\$21.75
No. 2X foundry, 2.25 to 2.75 sil.	20.75
No. 2 plain, 1.75 to 2.25 sil.	20.00
Basic (nominal)	21.00
Malleable (nominal)	22.00
Lake Superior charcoal	33.75

Finished Iron and Steel.—Business in pipe, on which prices have been reduced, has been unusually good. Improvement in the demand for bars has been definite and the lowest price now quoted is 1.60c. A mill is now quoting 1.65c. on its regular run of inquiries for small lots. Two attractive inquiries for reinforcing bars are out and both involve about 500 tons. Some desirable orders from jobbers have been placed with a bar mill, but the usual trend of business is for carload lots and less. Some increase in bar mill operation is pending. An interest having two bar mills in operation may put in a third within a few days. Wire business is quiet since the announcement of advances in price was made and most tonnages are booked on a 30-day basis. One interest has made some desirable sales for October delivery in this material. Structural activity is limited to small lots and nothing of attractive size is within sight.

Warehouse Business.—The only departure from the ordinary run of warehouse business has been an unusual demand for bands. Two orders calling for sizable tonnages in this material have engaged one warehouse and on one, to fill the demand, sheets cut to size were utilized. While figures on these tonnages are lacking, the orders are regarded as unusual "warehouse" orders. Bar and shape business continues fair, not with particular reference to the size of individual orders, but bearing more on an increase in the number. Advance in wire prices is expected to have a healthful effect on the market in that it indicates to buyers that a turn has developed and that price cutting has terminated.

We quote warehouse prices f.o.b. Buffalo as follows: Structural shapes, 2.90c.; plates, 2.90c.; No. 8 gage, 3.25c.; soft steel bars and shapes, 2.80c.; hoops, 3.50c.; blue annealed sheets, No. 10, 3.30c.; galvanized steel sheets, No. 28, 5c.; black sheets, No. 28, 4c.; cold-rolled strip steel, 6.40c.; cold-rolled round shafting, 4.05c.

Old Material.—There is difficulty in filling orders for cast scrap and a gross price of \$15.75 is now the rule. Consumers have not indicated a desire to pay \$13.50 for steel after several sales at that figure were completed. The market is a trifle weaker in this commodity. Generally the same optimistic feeling is prevalent, but no large movements have been made.

We quote dealers' asking prices per gross ton f.o.b. Buffalo as follows:

Heavy melting steel.	\$13.00 to \$13.50
Low phos., 0.004 and under.	14.50 to 15.50
No. 1 railroad wrought.	12.00 to 13.00
Car wheels	13.00 to 14.00
Machine shop turnings	4.00 to 5.00
Cast iron borings	4.00 to 5.00
Heavy axle turnings	8.00 to 9.00
Grate bars	8.00 to 9.00
No. 1 busheling	9.00 to 10.00
Stove plate	11.00 to 12.00
Bundled sheet stampings	6.00 to 7.00
No. 1 machinery cast.	14.00 to 15.00
Hydraulic compressed	9.50 to 10.00
Railroad malleable	12.00 to 12.50

San Francisco

SAN FRANCISCO, Sept. 14.

Pig Iron.—The past week or ten days has not witnessed any perceptible revival in actual business on the Coast, judging from the volume of sales reported. Few, if any, transactions are conspicuous by the tonnage involved; in fact, it appears that buyers have been refraining from extensive participation, confining their interest almost entirely to immediate needs, which at this time are rather light. There is no apparent change in prices, which, however, are nominal only.

Coke.—The sale of 500 tons of domestic coke to the Southern Pacific Co. a few days ago was the largest single transaction reported of recent date. While the actual figure has not been disclosed, it is understood to be considerably below the current market price. The inactivity of foundries continues greatly to curtail the demand for coke in this district. Some rather cheaper foreign coke has been offering.

Cast Iron Pipe.—Although actual business has not been particularly large of late, the market is considered in good condition, and operators expect considerable activity in municipal work, especially in southern California, in the succeeding weeks. Private corporation business still is light. Redwood City, Cal., will ask for bids on Sept. 19 for 65 tons of 4 and 8-in. pipe, and Madera will be in the market for 17,900 ft. of 4, 6, 8 and 10-in. pipe, which will be used for extending the present water works.

Finished Iron and Steel.—Little more than a continuation of the better inquiry for materials, which was recorded in the last report, has developed in this market recently. The interest in structural steel continues, and considerable buying in small lots is being done, but as yet there appears to be no manifest tendency to proceed with new large jobs. Jobbers report a good movement of stocks and steady replenishment buying. In the last week, certain jobbers have been purchasing freely, Belgian bars, which were offered at \$1.95, f.o.b. docks, duty paid, a price below that of domestic bars. Tank plates of foreign fabrication also have been available at the attractive price of \$2.15, f.o.b. docks, duty paid. The South continues to be a steady taker of sheets. One of the few sizable inquiries is for about 2200 tons of tank material for an oil company. Steel operators on the Coast point to the present freight rates as disadvantageous to the expansion of business here, and say that the new rate of \$5.70 a net ton on steel shipments moving from Pittsburgh to New York en route to the Orient threatens to divert the movement of steel from this port. Against the current rate of \$19.20 for transcontinental shipment from Pittsburgh to San Francisco and thence to the Far East is \$17.31, the charge via New York and the Canal.

Old Material.—The general limitation of activity by iron and steel interests makes unnecessary much purchasing of scrap, even if most foundries were not well supplied already; in fact, the large stocks held by railroads, dealers and producers in the country seem to preclude the possibility of a greatly increased consumption in the near future. The largest single sale of scrap reported involved 500 tons of steel plate punchings for ballast, on the basis of \$15 a net ton, f.o.b. cars, San Francisco. Cast iron scrap and heavy melting steel continue nominal at practically unchanged prices, while turnings and borings are offered at about \$5 gross ton, delivered.

The snow problem in cities is the subject of a meeting to be held at the Engineering Societies Building, New York, on the evening of Friday, Sept. 23, by the Metropolitan section of the American Society of Mechanical Engineers. Henry L. Doherty is to present the leading paper, and a number of engineers have been invited to participate in the discussion.

The Biggam Trailer Co., 425 East Water Street, Milwaukee, has recently increased its capital stock to \$250,000 preferred and 15,000 shares of common stock without par value.

Philadelphia

PHILADELPHIA, Sept. 20.

Steel prices continue very weak, though there is some indication of resistance on the part of a few companies whose losses at present selling prices are said to be greater than if their mills were allowed to remain idle. There is a feeling of hopefulness, however, because of a belief that consumers must soon realize that prices have actually reached bottom or very close to it. Within the past week prices of plates, shapes and bars have become definitely established at 1.60c., Pittsburgh, with reports of quotations as low as 1.50c., Pittsburgh, on plates and bars. The advance of \$5 a ton on sheets first announced by a Youngstown maker has not become general, and, in fact, some quotations, particularly on the heavier gages of blue annealed, have reached the lowest point since the decline, namely 2c. to 2.10c., Pittsburgh. Such low prices are not general, but have been made in a few instances. The reduction of about \$10 a ton on steel pipes and steel tubes by the leading industry has been quite generally followed by its competitors.

In pig iron there is a slightly firmer tendency, some makers having advanced their prices 50c. a ton on foundry grades.

Pig Iron.—Foundry iron has been advanced 50c. a ton by some of the makers in this district, the advance being due partly to the better position furnace order books are in as a result of recent buying and partly to the growing determination of operators to cut down their losses. A further advance of 50c. a ton is predicted and may take place within the week. This places No. 2 plain iron on the basis of \$20, No. 2X at \$20.50 and No. 1X at \$21.50, all f.o.b. furnace, though at least one seller with freight rates averaging more than \$1.50 a ton is still quoting on the basis of \$19.50. Pig iron business in this district is showing no marked expansion, but a fairly satisfactory volume is being booked, mostly in lots of a few hundred tons, and furnaces are selling and shipping more than they are making. For example, one furnace has sold 11,000 tons so far this month, which is more than its monthly output. Consumers are usually anxious to cover for the remainder of the year, and in some instances are inquiring for first quarter of next year. One or two sales for January-February shipment have been made, but generally sellers are unwilling to make commitments beyond Jan. 1. The firmer tendency in the coke market leaves furnace operators in doubt as to what their production costs may be next year. Furnace coke is available for shipment over the remainder of this year at \$3.50, Connellsville, but quotations have not been made beyond that period. A 100-ton sale of basic iron was made at \$19.50, furnace, but there is no inquiry for larger tonnages. Low phosphorus iron is dull with prices unchanged. The Princess furnace will go out of blast within a week, thus putting the entire Virginia iron-making industry on the inactive list. The Robeson furnace, which blew in several weeks ago to make copper-bearing low phosphorus and foundry iron, will go out of blast this week and may require some lining repairs. A quantity of iron sufficient to take care of expected wants of its customers has been piled.

The following quotations are, with the exception of those on low phosphorus iron, for delivery at Philadelphia, and include freight rates varying from 84 cents to \$1.54 per gross ton:

East. Pa. No. 2 plain, 1.75 to 2.25 sil.	\$20.84 to \$21.26
East. Pa. No. 2X, 2.25 to 2.75 sil.	21.34 to 21.76
Virginia No. 2 plain, 1.75 to 2.25 sil.	27.74 to 28.74
Virginia No. 2X, 2.25 to 2.75 sil.	28.24 to 29.74
Basic deliv. eastern Pa.	19.25 to 20.75
Gray forge	20.00 to 21.00
Malleable	22.00 to 23.00
Standard low phos. (f.o.b. furnace)	36.50
Copper bearing low phos. (f.o.b. furnace)	35.00

Coke.—Furnace coke for delivery over the remainder of the year is now available at \$3.50, Connellsville. Foundry coke is quoted at \$4.25 to \$4.75, Connellsville.

Ferroalloys.—Domestic producers of ferromanganese are meeting the prices named by agents of the British producers, namely \$58.35, Atlantic seaboard. Demand has improved, one maker having booked 1000 tons in small lots during the past week. Spiegeleisen is nominally quoted at \$26 and \$27, furnace.

Semi-Finished Steel.—While there is virtually no demand for billets, producers have no difficulty in getting \$30 for rerolling quality and \$35 for forging quality, Pittsburgh, on such small orders as they are booking.

Plates.—The plate market continues decidedly weak, and while there is no confirmation of reports of quotations as low as 1.50c., Pittsburgh, it is definitely established that the market is at least on a 1.60c. basis. Small orders have been taken at the latter price. Some makers are showing more resistance toward the low prices. An Eastern company has, for example, set its price at 1.65c., and may decide to quote 1.75c., Pittsburgh, with a determination to let its mills remain idle rather than to continue taking business at such a heavy loss. Eastern car builders are figuring on 1000 steel hopper cars for the Delaware, Lackawanna & Western and 1000 steel car bodies for the Baltimore & Ohio.

Structural Material.—Shapes are now obtainable at 1.60c., Pittsburgh, on ordinary lots, and it is intimated that fabricators, figuring on particularly desirable work, have been given protection at a shade under this price. In this immediate locality considerable work is being held up on which action had been expected at an earlier date. The Chestnut Street pier work, requiring about 1000 tons, may be awarded this week. Other important enterprises on which no decision has been reached include the addition to Haddon Hall, Atlantic City, and a new Stanley theater. A high school for Pottstown, Pa., will require 350 tons of steel and a school building at Kearney, N. J., 275 tons. Figures are being obtained for an office building to be erected at Fifteenth and Locust streets, Philadelphia.

Bars.—Though quotations as low as 1.50c., Pittsburgh, on steel bars are commonly reported, it is stated that such prices have applied only to sizable tonnages of reinforcing bars. For example, 800 tons of reinforcing bars for the Western Maryland Railroad elevator at Baltimore were bought from an Eastern mill at less than 1.50c., Pittsburgh. The price generally quoted on merchant steel bars is 1.60c., Pittsburgh. A fair volume of business is being booked, but mill operations are not noticeably increasing. Bar iron is quoted at 1.60c. to 1.65c., Pittsburgh.

Sheets.—A Youngstown maker of sheets advanced prices last week \$5 a ton, but other makers have not generally followed this advance, though some still have the matter under consideration. Coincident with the advance, some mills made the lowest prices which have yet been quoted. For example, heavy gages of blue annealed sheets have sold from 2c. to 2.10c., Pittsburgh, and there have also been concessions on black and galvanized.

Warehouse Business.—A fair gain in sales of steel out of stock is reported.

Old Material.—The market continues quiet with prices virtually unchanged. However, there is a firm undertone. We quote for shipment to consuming points in this district as follows:

No. 1 heavy melting steel	\$11.50 to \$12.00
Scrap rail	11.50 to 12.00
Steel rails, rerolling	15.00 to 15.50
No. 1 low phos., heavy 0.04 and under	16.00 to 17.00
Car wheels	17.00 to 17.50
No. 1 railroad wrought	15.00 to 15.50
No. 1 yard wrought	13.50 to 14.00
No. 1 forge fire	10.00 to 10.50
Bundled sheets (for steel works)	8.00 to 9.00
No. 1 busheling	11.50 to 12.00
No. 2 busheling	10.00 to 11.00
Turnings (short shoveling grade for blast furnace use)	8.00 to 8.50
Mixed borings and turnings (for blast furnace use)	8.00 to 8.50
Machine-shop turnings (for rolling mill and steel works use)	8.00 to 8.50
Heavy axle turnings (or equivalent)	9.50 to 10.00
Cast borings (for rolling mills)	9.00 to 9.50
Cast borings (for chemical plants)	No market
No. 1 cast	17.00 to 18.00
Railroad grate bars	12.50 to 13.50
Stove plate (for steel plant use)	12.50 to 13.00
Railroad malleable	15.50 to 16.50
Wrought iron and soft steel pipes and tubes (new specifications)	13.00 to 13.50
Iron car axles	No market
Steel car axles	No market

British Iron and Steel Market

Makers' Position Improves with Stiffening of Continental Prices—Activity Still Retarded by Fuel Prices

(By Cable)

LONDON, ENGLAND, Sept. 20.

Cleveland iron is again stagnant. Sellers quote No. 3 foundry at £6 (\$22.32) for October delivery, but consumers show no anxiety to purchase. Coke prices are keeping up, and hindering the re-starting of more furnaces. Iron-masters state that they are now running at a loss.

Hematite is more active. Nine Northeastern furnaces are now blowing. Makers are so anxious for orders that they are cutting shipment prices. The home demand is quiet. Bilbao Rubio ore is quoted at £1 8s. (\$5.21) and upward, c.i.f., Tees.

British steel makers are securing more export orders by cutting quotations, but home trade buying is still in abeyance. Guest, Keen & Nettlefolds, Ltd., are partly reopening their plants, to enable their workers to tide over the present crisis.

Continental competition is less keen, as prices from across the Channel are advancing. French merchant bars have been sold at £8 7½s. (1.39c. per lb.) f.o.b., but £8 12½s. (1.43c. per lb.) f.o.b., is now asked. Belgian merchant bars are quoted up to £9 (1.49c. per lb.) f.o.b., for shipment in 6 to 8 weeks. German merchant bars also are held at £9 f.o.b. for December and January shipment.

German plates 3/16 in. thick and under are quoted at £9 f.o.b. for shipment in 6 weeks. German wire nail makers refused 23s. (\$4.28) c.i.f. for Japanese specifications. British wire rods are obtainable below £11 10s. (\$42.78) f.o.b.

Tin plates are more active, especially for home consumers, and fair business is being done in odd sizes. The Far East is still buying. More mills have started, and the Welsh output is now about 30 per cent of capacity. It is anticipated that it will reach 45 per cent before long.

Galvanized sheets are weak, business being done at £19 10s. (3.24c. per lb.) f.o.b. for No. 24 gage, and at £28 5s. (4.69c. per lb.) f.o.b. for Shanghai specifications. There is more inquiry, and more mills are running. Belgium is quoting on No. 15 gage black sheets at £10 10s. (1.74c. per lb.) f.o.b.

We quote per gross ton, except where otherwise stated, f.o.b. maker's works, with American equivalent figured at \$3.72 per £1 as follows:

Durham coke, delivered...	£1 15	\$6.51
Cleveland basic	7 7½ & £7 10*	27.45 & \$27.90
Cleveland No. 1 foundry...	7 0	26.04
Cleveland No. 3 foundry...	6 5	23.25
Cleveland No. 4 foundry...	5 19	22.13
Cleveland No. 4 forge...	5 17½	21.85
Hematite	7 0*	26.04
East Coast mixed...	7 0 & 6 15*	26.04 & 25.11
Ferromanganese	18 0 & 14 10*	66.96 & 53.94
Rails, 60 lb. and up...	10 0 to 14 0	37.20 to 52.08
Billets	7 10 to 8 0	27.90 to 29.76
Sheet and tin plate bars, Welsh	8 0 to 8 10	29.70 to 31.62
Tin plate base box...	1 1 to 1 2½	3.90 to 4.18
C. per Lb.		
Ship plates	12 10 to 14 0	2.08 to 2.32
Boiler plates	18 0 to 19 0	2.99 to 3.16
Tees	12 10 to 14 10	2.08 to 2.41
Channels	11 15 to 13 15	1.95 to 2.28
Beams	11 10 to 13 10	1.91 to 2.24
Round bars, ¾ to 3 in.	12 0 to 12 10	1.99 to 2.08
Galvanized sheets, 24 g.	19 0	3.15
Black sheets	16 0	2.66
Steel hoops	14 5 & 14 0*	2.37 & 2.32
Cold rolled steel strip, 20 g.	26 10	4.40

*Export price.

High Fuel Cost Hampers Pig Iron Output—Semi-Finished Steel Lower

LONDON, ENGLAND, Sept. 7.—Business in the iron and steel trades still hangs fire. The main reason is the high cost of production which is everywhere pre-

venting manufacturers from reopening their works and producing at a normal rate. Each day sees further collieries forced to shut down owing to the high wages they have to pay, which in turn prevents them from reducing the selling price of their products. Only recently the Stavely Coal & Iron Co., shut down one of its collieries on this account. Until the miners are willing to accept a reasonable wage for their work, costs cannot come down. The iron and steel trade in the meantime is waiting on cheaper fuel.

In the Cleveland district there are now 14 blast furnaces blowing and, though the demand for foundry iron has certainly increased, makers cannot see their way to relight their furnaces on a wholesale scale. There is practically no foundry iron available except No. 4, for which 125s. is asked for both home and export. No. 3 G. M. B. is quoted at 135s. In the hematite trade business is a little more brisk, but makers had to cut the prices to get the orders and, because there was business to be done, reduced the home trade quotation to the level of that for shipment material; East Coast mixed numbers are now quoted at 140s. for both home and foreign consumption.

A welcome feature in the finished and semi-finished steel markets is the fact that continental makers are now out of the running for semi-finished steel and, British makers being inclined to cut their prices, have at last secured some good sized orders. In finished steel, however, prices here are still far above those at which material can be supplied by the continental makers, with the result that business does not show any marked improvement. Home quotations were recently reduced by 20s. a ton, but the drop has not proved sufficiently attractive to buyers.

Here and there one hears of improvements in employment such as the reopening of the Ebbw Vale Steel & Iron Co., works, and Palmer's Steel Works, both of which have been idle for six months or more, but this really only means that the works have got together a sufficiency of orders to justify them making a start, and are going through that program. An instance of the depression in the trade in Sheffield is shown in the reports of the Sheffield Bankers' clearings which up to Aug. 20 were more than £16,000,000 below the aggregate of the same period last year. For the week ended Aug. 20 the turnover totalled £841,561, a fall of over half a million pounds compared with the same week a year before.

Union Steel Casting Co. Absorbed

The fixed assets and inventories of the Union Steel Casting Co., 53 Gerard Street, Roxbury, Boston, have been purchased by the Roxbury Steel Casting Co., a Massachusetts corporation, capitalized for \$50,000. Isaac E. Sexton, Winchester, is president of the new company, and Perley C. Rogers, Quincy, treasurer and general manager. These two gentlemen and George A. Sexton constitute the board of directors.

J. T. Phelps remains as superintendent of the Roxbury Steel Casting Co. and the foundry organization will be as heretofore. R. L. Adams continues in charge of the laboratory. The new company has rebuilt the open-hearth furnace, which now has 15-ton capacity, and has made minor changes to facilitate production of open-hearth castings ranging in size from 1 lb. to 12 tons, and to handle any specification castings required. The new management expects to resume operations this week. It plans to maintain a normal working force of 220, but will begin operations with a somewhat reduced number.

The New York Central Railroad, Grand Central Terminal, New York, will receive bids until 12 o'clock noon, Sept. 29, for immediate requirements for shop and operating equipment, including rolled steel gears, wire fence, track bolts, volt cables and parts, manganese frogs and bottom plates for crossing frogs, as per specifications on file at the office of W. C. Bower, purchasing agent.

Prices Finished Iron and Steel, f.o.b. Pittsburgh

Freight Rates

Freight rates from Pittsburgh on finished iron and steel products, in carload lots, to points named, per 100 lb., are as follows:

Philadelphia	\$0.35	St. Paul	\$0.665
Baltimore	0.335	Omaha	0.815
New York	0.38	Omaha (pipe)	0.77
Boston	0.415	Denver	1.35
Buffalo	0.295	Denver (wire products)	1.415
Cleveland	0.24	Pacific Coast	1.665
Cincinnati	0.325	Pacific Coast, ship plates	1.335
Indianapolis	0.345	Birmingham	0.765
Chicago	0.38	Jacksonville, all rail	0.555
St. Louis	0.475	Jacksonville, rail and water	0.46
Kansas City	0.815	New Orleans	0.515
Kansas City (pipe)	0.77		

The minimum carload to most of the foregoing points is 36,000 lb. To Denver the minimum loading is 40,000 lb., while to the Pacific Coast on all iron and steel products, except structural material, the minimum is 80,000 lb. On the latter item the rate applies to a minimum of 50,000 lb., and there is an extra charge of 9c. per 100 lb. on carloads of a minimum of 40,000 lb. On shipments of wrought iron and steel pipe to Kansas City, St. Paul, Omaha and Denver, the minimum carload is 46,000 lb. On iron and steel items not noted above the rates vary somewhat and are given in detail in the regular railroad tariffs.

Rates from Atlantic Coast ports (i.e., New York, Philadelphia and Baltimore) to Pacific Coast ports of call on most steamship lines, via the Panama Canal, are as follows: Pig iron, 55c.; ship plates, 75c.; ingot and muck bars, structural steel, common wire products, including cut or wire nails, spikes and wire hoops, 75c.; sheets and tin plates, 60c. to 75c.; rods, wire rope, cable and strands, \$1; wire fencing, netting and stretcher, 75c.; pipe, not over 8 in. in diameter, 75c.; over 8 in. in diameter, 2 1/2 c. per in. or fraction thereof additional. All prices per 100 lb. in carload lots, minimum 40,000 lb.

Structural Material

I-beams, 3 to 15 in.; channels, 3 to 15 in.; angles, 3 to 6 in., on one or both legs, 1/4 in. thick and over, and zebs, structural sizes, 1.60c. to 1.70c.

Wire Products

Wire nails, \$2.90 base per keg; galvanized, 1 in. and longer, including large-head barbed roofing nails, taking an advance over this price of \$1.25 and shorter than 1 in., \$1.75; bright Bessemer and basic wire, \$2.60 per 100 lb.; annealed fence wire, Nos. 6 to 9, \$2.60; galvanized wire, \$3.10; galvanized barbed wire, \$3.55; galvanized fence staples, \$3.55; painted barbed wire, \$3.05; polished fence staples, \$3.05; cement-coated nails, per cent keg, \$2.45; these prices being subject to the usual advances for the smaller trade, all f.o.b. Pittsburgh, freight added to point of delivery, terms 60 days, net, less 2 per cent off for cash in 10 days. Discounts on woven-wire fencing are 68 to 70 1/2 per cent off list for carload lots, 67 to 69 1/2 per cent for 1000-rod lots, and 66 to 68 1/2 per cent for small lots, f.o.b. Pittsburgh.

Bolts, Nuts and Rivets

Large structural and ship rivets	\$2.20 to \$2.50
Large boiler rivets	2.35 to 2.60
Small rivets	70, 10 and 10 per cent off list
Machine bolts, small, rolled threads	70, 10 and 7 1/2 per cent off list
Machine bolts, small, cut threads, 65 and 10 to 70 and 5 per cent off list	
Machine bolts, larger and longer, 65 and 10 to 65, 10 and 5 per cent off list	
Carriage bolts, 3/4 in. x 6 in.; smaller and shorter rolled threads, 70 and 5 per cent off list	
Cut threads	65 and 10 per cent off list
Longer and larger sizes	60, 10 and 5 per cent off list
Lag bolts	70, 10 and 5 per cent off list
Flow bolts, Nos. 1, 2 and 3 heads	60 and 10 per cent off list
Other style heads	20 per cent extra
Machine bolts, c.p.c. and t. nuts, 3/4 in. x 4 in.; smaller and shorter	60, 10 and 5 per cent off list
Larger and longer sizes	60 and 5 per cent off list
Hot pressed sq. or hex. blank nuts	\$4.60 to \$5.25 off list
Hot pressed nuts, tapped	4.25 to 5.00 off list
C.p.c. and t. sq. or hex. blank nuts	4.60 to 5.10 off list
C.p.c. and t. sq. or hex. blank nuts, tapped	4.25 to 4.75 off list
Semi-finished hex. nuts:	
1/4 in. to 9/16 in. inclusive	80, 10 and 10 per cent off list
Small sizes S. A. E.	80, 10 and 10 per cent off list
1/2 in. to 1 in. inclusive, U. S. and S. A. E.	70, 10, 10 and 10 per cent off list
Stove bolts in packages	80, 10 and 5 per cent off list
Stove bolts in bulk	80, 10 and 7 1/2 per cent off list
Tire bolts	65, 10 and 10 per cent off list
Track bolts	3.50c. to 3.75c. base

Mill Square and Hex. Head Cap Screws

1/2 in. and under 70 and 10 per cent off list |

9/16 in. to 3/4 in. 70 and 10 per cent off list |

Mill Set Screws

1/2 in. and under 70, 10 and 5 per cent off list |

9/16 in. to 3/4 in. 70, 10 and 5 per cent off list |

Rivets

Rivets, 1c. per lb. extra for less than 200 kegs. Rivets in 100-lb. kegs, 25c. extra to buyers not under contract; small and miscellaneous lots less than two tons, 25c. extra; less than 100 lb. of a size or broken kegs, 50c. extra.

All prices carry standard extras f.o.b. Pittsburgh.

Wire Rods

No. 5 common basic or Bessemer rods to domestic consumers, \$41; chain rods, \$41; screw stock rods, \$46; rivet and bolt rods and other rods of that character, \$41; high carbon rods, \$49 to \$53, depending on carbons.

Railroad Spikes and Track Bolts

Railroad spikes 9/16-in. and larger, \$2.40 to \$2.50 base per 100 lb. in lots of 200 kegs of 200 lb. each or more; spikes, 1/2-in., 3/4-in. and 7/16-in., \$2.65 to \$2.75 base; 5/16-in., \$2.65 to \$2.75 base. Boat and barge spikes, \$2.65 to \$2.75 base per 100 lb. in carload lots of 200 kegs or more, f.o.b. Pittsburgh. Track bolts, \$3.50 to \$3.75 base per 100 lb. Tie plates, \$2 per 100 lb.

Terne Plates

Prices of terne plates are as follows: 8-lb. coating, 200 lb., \$11.30 per package; 8-lb. coating, 1 C., \$11.60; 15-lb. coating, 1 C., \$14.30; 20-lb. coating, 1 C., \$15.55; 25-lb. coating, 1 C., \$16.80; 30-lb. coating, 1 C., \$17.80; 35-lb. coating, 1 C., \$18.80; 40-lb. coating, 1 C., \$19.80 per package, all f.o.b. Pittsburgh, freight added to point of delivery.

Iron and Steel Bars

Steel bars, 1.50c. to 1.65c. from mill. Refined bar iron, 2.25c.

Welded Pipe

The following discounts are to jobbers for carload lots on the Pittsburgh basing card:

Steel			Iron		
Inches	Black	Galv.	Inches	Black	Galv.
1/4	54 1/2	28	1/4 to 3/8	36 1/2	22 1/2
1/2	57 1/2	31	3/8	36 1/2	18 1/2
3/4	62 1/2	48	3/4	42 1/2	27 1/2
1	66 1/2	54	1 to 1 1/2	44 1/2	29 1/2
1 to 3	68 1/2	56			
2	61 1/2	49	Lap Weld		
2 1/2 to 6	65 1/2	53	2	39 1/2	25 1/2
7 to 8	62 1/2	49	2 1/2 to 6	42 1/2	29 1/2
9 to 12	61 1/2	48	7 to 12	40 1/2	27 1/2
Butt Weld, extra strong, plain ends					
1/4	50 1/2	33	1/4 to 3/8	41 1/2	37 1/2
1/2	53 1/2	35	3/8	35 1/2	23 1/2
3/4	59 1/2	48	3/4	42 1/2	28 1/2
1	64 1/2	53	1 to 1 1/2	44 1/2	30 1/2
1 to 1 1/2	66 1/2	55			
2 to 3	68 1/2	56	Lap Weld, extra strong, plain ends		
			2	40 1/2	27 1/2
2 1/2 to 4	63 1/2	52	2 1/2 to 4	43 1/2	31 1/2
4 1/2 to 6	62 1/2	51	4 1/2 to 6	42 1/2	30 1/2
7 to 8	58 1/2	45	7 to 8	35 1/2	23 1/2
9 to 12	52 1/2	39	9 to 12	30 1/2	18 1/2

To the large jobbing trade the above discounts are increased by one point, with extra discounts of 5 and 2 1/2 per cent.

Boiler Tubes

The following are the discounts for carload lots f.o.b. Pittsburgh:

Lap Welded Steel		Charcoal Iron	
1 1/4 in.	26 1/2	1 1/2 in.	List
2 to 2 1/4 in.	41	1 3/4 to 1 1/2 in.	18
2 1/2 to 3 in.	52	2 to 2 1/4 in.	20
3 1/4 to 13 in.	57	2 1/2 to 3 in.	25
		3 1/4 to 4 1/2 in.	27

Standard Commercial Seamless Boiler Tubes

New discounts have been adopted on standard commercial seamless boiler tubes, but manufacturers are not yet ready to announce them for publication, and for that reason we publish no discounts this week.

Sheets

Prices for mill shipments on sheets of standard gage in carloads, f.o.b. Pittsburgh, follow:

Blue Annealed		Box Annealed, One Pass Cold Rolled	
Cents per Lb.		Cents per Lb.	
Nos. 8 and heavier	2.20-2.45	Nos. 11 and 12	2.30-2.55
Nos. 9 and 10		Nos. 13 and 14	2.35-2.60
(base)	2.25-2.50	Nos. 15 and 16	2.45-2.70
Galvanized		Tin-Mill Black Plate	
Cents per Lb.		Cents per Lb.	
Nos. 10 and 11	2.75-3.00	Nos. 25 and 26	3.45-3.70
Nos. 12 to 14	2.85-3.10	No. 27	3.60-3.85
Nos. 15 and 16	3.00-3.25	No. 28 (base)	3.75-4.00
Nos. 17 to 21	3.15-3.40	No. 29	4.00-4.25
Nos. 22 to 24	3.30-3.55	No. 30	4.25-4.50
Nos. 15 and 16	2.55-2.80	No. 28 (base)	2.75-3.00
Nos. 17 to 21	2.60-2.85	No. 29	2.80-3.05
Nos. 22 to 24	2.65-2.90	No. 30	2.80-3.05
Nos. 25 to 27	2.70-2.95	Nos. 30 1/2 and 31	2.85-3.10

NON-FERROUS METALS

The Week's Prices

Cents Per Pound for Early Delivery

Sept.	Copper, New York		Tin		Lead		Zinc	
	Lake	Electro-lytic	New York	New York	St. Louis	New York	St. Louis	
14	12.25	12.00	26.50	4.60	4.40	4.70	4.20	
15	12.25	12.00	26.25	4.60	4.40	4.70	4.20	
16	12.25	12.12½	26.00	4.60	4.40	4.70	4.20	
17	12.25	12.12½	....	4.60	4.40	4.70	4.20	
19	12.25	12.12½	26.37½	4.60	4.40	4.67½	4.17½	
20	12.25	12.12½	26.50	4.65	4.45	4.67½	4.17½	

New York

NEW YORK, Sept. 20.

Some metals have shown improvement and some are unchanged both as to buying and prices. Demand for copper continues very light but prices are firm. There is moderate buying of tin, with steadiness as to value. Lead is the most active of the metals and prices have advanced again. With no improvement in the demand for zinc, the market is easier.

Copper.—This market presents the rather unusual spectacle of prices advancing in the last few weeks, but without the increase in buying usually seen in such circumstances. The situation is a distinct disappointment to sellers, both inquiry and buying being very light. An appraisal of values is difficult under the circumstances, but on electrolytic copper, where quotations are at all obtainable, 12.12½c., New York, is generally named, or 12.37½c., delivered, on early shipment. It is possible that 12.25c., delivered, could be done, but there has been no real test of the market. Lake copper is quiet and nominal at 12.25c. to 12.37½c., delivered. The explanation of the small demand is that consumers are not having an active demand for their finished products, although sentiment in that part of the trade is better than for some time. There is also the opinion that the advance in price of copper was not justified and that the metal will be obtainable on a lower basis later. The estimate of the U. S. Geological Survey that stocks of refined copper in the country are from 750,000,000 to 1,250,000,000 lb., while it represents a wide "spread," is not generally accepted by the trade, the outside figure being considered high.

Tin.—The moderately active demand for Straits tin which has been the feature of the market for most of the last few weeks continues, and sales for the week this report covers have probably totaled 500 tons of future shipment metal at prices ranging from 26.25c. last Friday to 26.62½c. last Wednesday. Probably 200 tons was sold on Sept. 14 and 200 to 300 tons on Sept. 15, with light sales on Sept. 16. Business for October-November shipment from the East was done in small lots yesterday at 26.37½c., while 26.50c. was bid at the close. On some of the days consumers and dealers were equal participants in the business and inquiry from consumers has been fair most of the time. Spot Straits tin, New York, is quoted to-day at 26.50c., and quotations in the London market are as follows: Spot standard, £155 10s.; future standard, £157 15s.; spot Straits, £156 5s., or about £1 per ton lower than a week ago. Arrivals thus far this month have been 2225 tons and 3050 tons is reported afloat.

Lead.—Another advance was made late to-day by the American Smelting & Refining Co. from 4.60c. to 4.65c., New York and St. Louis. Quotations of independents are largely nominal at 4.65c., New York, or 4.40c. to 4.45c., St. Louis, but few of these producers are quoting in this market, the present demand being largely satisfied by the leading interest. Buying is reported good, with some consumers heard from for the first time in a long period.

Zinc.—This market continues featureless and slightly easier, prime Western for early delivery being available as low as 4.17½c., St. Louis, or 4.67½c., New York.

Unconfirmed reports are that one or two sellers have offered as low as 4.15c., St. Louis. Buying by galvanizers and others is spasmodic and generally for small lots, but there is more inquiry for forward delivery.

Antimony.—The market is nominally unchanged at 4.45c., New York, duty paid, for wholesale lots for early delivery.

Aluminum.—The leading domestic producer continues to quote virgin metal, 98 to 99 per cent pure, at 24.50c., f.o.b. plant, in wholesale lots for early delivery, while the same grade from importers is obtainable at 19c. to 20c., New York, duty paid.

Old Metals.—The market is fairly firm and is marking time awaiting developments in the new metal market. Dealers' selling prices are nominally as follows:

	Cents Per Lb.
Copper, heavy and crucible.....	11.75
Copper, heavy and wire.....	11.00
Copper, light and bottoms.....	9.00
Heavy machine composition.....	9.75
Brass, heavy.....	6.75
Brass, light.....	5.00
No. 1 red brass or composition turnings.....	7.75
No. 1 yellow rod brass turnings.....	5.00
Lead, heavy.....	4.00
Zinc.....	3.00
Lead, tea.....	3.00

Chicago

Sept. 20.—Trading has been exceedingly dull in all the metals and slight declines are noted in tin and zinc, the former being now quoted at 28c. and the latter at from 4.25c. to 4.30c. Old metal prices are unchanged. We quote in carload lots: Lake copper, 12.50c. to 12.75c.; tin, 28c.; lead, 4.50c.; spelter, 4.25c. to 4.30c. in less than carload lots; antimony, 7c. On old metals we quote: Copper wire, 7c.; crucible shapes, 7c.; copper clips, 7c.; copper bottoms, 6c.; red brass, 6c.; yellow brass, 4.50c.; lead pipe, 2.50c.; zinc, 1.75c.; pewter, No. 1, 17c.; tin foil, 18c.; block tin, 20c.; all buying prices for less than carload lots.

St. Louis

ST. LOUIS, Sept. 20.—The lead market is quiet and unchanged while slab zinc is dull and lower. We quote lead at 4.40c. carlots and zinc at 4.17½c. We quote Lake copper at 12.98½c., carlots; tin, 27.36c.; and antimony, 5.23½c. In old metals we quote: Light brass, 3.50c.; heavy yellow brass, 5c.; heavy red brass, heavy copper and copper wire, 7.50c.; light copper, 6.50c.; block tin, 20c.; tin foil, 18c.; zinc, 2.75c.; lead, 3c.; tea lead, 2c. and aluminum, 9c.

The General Alloys Co., New York and Chicago, announces a new heat resisting alloy at a base price of 20c. per lb. This alloy, it is claimed, has about four times the life of steel and retains its shape at high temperatures. It is covered by a patent recently issued. It will be sold under the trade name of X-ite and is the fourth material to be sold under the Q-alloy trade name.

Production of Portland cement in August amounted to 10,244,000 bbl., a gain of 15 per cent over the average August of the past four years. Each month of the year has seen a consistent increase in production over its predecessor, but stocks have fallen sharply, due to excess of shipments (12,340,000 bbl. in August) over production every month since April.

Ground has been broken for an addition to the plant of the Wyckoff Drawn Steel Co., Ambridge, Pa., which, when completed, will put under cover more than half an acre of manufacturing space. The American Bridge Co., will fabricate the steel, amounting to about 100 tons, and it is expected to have the new portion of the plant in operation early in 1922.

PERSONAL

Paul Boulanger, a director of Thyssen & Co., Mulheim, Ruhr Region, Germany, is now visiting the United States on a tour of inspection of heavy material handling appliances in use here. Mr. Boulanger recently visited the Farrell Steel Works of the Carnegie Steel Co., at Farrell, Pa. and has also investigated the ore handling machinery at Duluth. His headquarters while in this country are with F. A. Borgemeister, 50 Church Street, New York.

Charles B. Tamm, for several years chief purchasing agent LeRoi Co., Milwaukee, manufacturer of automobile and tractor engines, has resigned to become assistant general manager of the Hydro-Hoist Co., a subsidiary of the Heil Co., Milwaukee, manufacturer of steel dump bodies, compartment truck tanks, hydraulic hoists, etc.

C. C. Hanch, Indianapolis, vice-president National Automobile Chamber of Commerce, is to become executive vice-president of the United States Automotive Corporation. The subsidiaries of the corporation are the Lexington Motor Co., the Ansted Engineering Co., the Ansted Spring & Axle Co., the Connersville Foundry Corporation, the Fayette Trimming & Painting Co., and the Teetor-Hartley Motor Corporation. Frank B. Ansted is president of the corporation. Mr. Hanch will have headquarters at Connersville, Ind., home office of the United States Automotive Corporation. Mr. Hanch had long been connected with the Nordyke & Marmon Co., Indianapolis, and with the Studebaker Corporation, South Bend, Ind. During the war he was chief of the automotive products section of the War Industries Board. After the war he went to Europe as trade commissioner for the Department of Commerce.

The American Steel Export Co. has closed its branch office at Rio de Janeiro, Brazil, and J. D. W. Snowden, general representative in charge, has returned to the United States. His present address is 5228 Laurens Street, Germantown, Philadelphia.

W. G. Jones has been elected vice-president and treasurer of the W. A. Jones Foundry & Machine Co., Chicago, and will continue to serve as general manager.

Stuart F. Brown, formerly production engineer with the Whitin Machine Works, Whitinsville, Mass., manufacturer of textile machinery, is now manager of the Whitinsville Spinning Ring Co.

J. C. Holt, president Antrim Iron Co., Grand Rapids, Mich., has returned from a four months' trip through Europe.

J. M. Meany, formerly Western manager Clyde Iron Works, Duluth, Minn., has become president of the Ball Engineering Co., Portland, Ore.

P. S. Van Wyck has joined the Mesabi Iron Co., Babbitt, Minn., having resigned from the Great Western Railroad.

Edward Flad has resigned as a member of the Missouri Public Service Commission and will return to St. Louis to follow his profession as a consulting engineer.

John D. Hurley, president Independent Pneumatic Tool Co., 600 West Jackson Boulevard, Chicago, manufacturer of air and electric tools, arrived in New York on the New Amsterdam Sept. 9 and reached the home office in Chicago, Sept. 15. Accompanied by Mrs. Hurley, he has just completed a six weeks' trip abroad, visiting all the principal points of Continental Europe.

A. F. Soben, formerly assistant chief engineer American Machine & Mfg. Co., Atlanta, Ga., has opened offices in Los Angeles, Cal., as consulting engineer and designer of special and automatic machinery.

I. N. Zavarine, formerly metallographist Winchester Repeating Arms Co., New Haven, Conn., has been appointed assistant in the mechanical engineering department of the Massachusetts Institute of Technology, Boston.

S. E. Allen, engineer Stevens-Duryea Co., Chicopee Falls, Mass., automobile manufacturer, has resigned to accept a position on the Pacific Coast. E. E. Nichols, superintendent, has resigned, but has made no plans for the immediate future.

J. M. Lloyd has resigned as superintendent of the Lowellville, Ohio, plant of the Sharon Steel Hoop Co., Sharon Pa., effective Oct. 1, after serving two and a half years.

L. R. Samuels, formerly assistant sales manager William Jessop & Sons, Inc., New York, high-speed steel, has returned to that company after a year's absence. He will make his headquarters in New York.

N. W. Elmer, formerly engineer for the Harry M. Hope Engineering Co., Boston, has opened an office in Quincy, Mass., as consulting engineer in conveying and mechanical handling.

Chester C. Jackman, formerly factory manager Victor Saw Works, Springfield, Mass., has been made vice-president and treasurer of the Dolman Mfg. Co., Springfield.

John M. Smith, formerly designer for the Hooven, Owens, Rentschler Co., is now in the engineering department of the Gardner Governor Co., Quincy, Ill.

Earl F. Heimpel, M. E., formerly chief engineer of the Edison Portland Cement Co., Stewartville, N. J., has resigned to join the sales force of the M. J. Dougherty Co., piping fabricator and engineers, Philadelphia. He is a graduate of Lehigh University, has had a wide experience in the engineering field and will be located in the home office.

James A. Brakes, Jr., has become structural engineer for the Chateaugay Ore & Iron Co., Lyon Mountain, N. Y., having resigned his position as head of the department of mechanical engineering at Ohio Northern University, Ada, Ohio.

Robert L. Crane, for 23 years Western New York manager Henry Prentiss & Co., Inc., has terminated his connections with that company and will continue in the same line of business under the name of Crane Machinery Co., with offices at 501 D. S. Morgan Building, Buffalo. He is now establishing selling connections with a view of having in the near future branch offices in Rochester, Syracuse and Albany.

Parker M. Robinson has been transferred from the marine engineering department of the Westinghouse Electric & Mfg. Co. to the power sales department of the same company and has been sent to Los Angeles, Cal., as a specialist in steam power apparatus.

M. C. Gillett has become manager of the plant of the Standard Heater Co., Williamsport, Pa., having been transferred from the management of the Philadelphia branch office.

D. T. Farnham, formerly consulting industrial engineer, St. Louis, has become vice-president of C. E. Knoeppel & Co., Inc., New York.

W. L. Conrad, for many years manager of the office of the late H. L. Gantt, assisting in the introduction of industrial management methods, has opened an office in New York for consulting practice along the same lines.

Boyd Fisher, formerly with the Tabor Mfg. Co., Philadelphia, as industrial engineer, is now with Lockwood, Greene & Co., Boston.

Edmund L. Barto and Harry J. Phillips, formerly sales engineer and chief engineer, respectively, of the New York office of the Austin Co., have formed the Barto-Phillips Co., engineer and builder, with offices at 280 Madison Avenue, New York, to engage in the engineering design, construction and exportation of all classes of industrial buildings, including power house and equipment requirements.

ACTIVE BUYING BY JAPAN

A 4000-Ton Rail Contract—Hydroelectric Project Including 1800 Transmission Towers

NEW YORK, Sept. 20.—Japanese buying and pending contracts for large projects continue to hold first place in exports of iron and steel. In all foreign markets there is evidence of lessening competition from Germany, due to the filled-up condition of the German mills, coupled with the more or less hand-to-mouth buying that now prevails in practically all markets. One of the recent large inquiries was for 4000 tons of 60-lb. rails for the Imperial Japanese railroads. These have been placed with Suzuki & Co. at a reported price of \$49.98 per ton delivered Japanese port. A contract for 660 tons of structural steel for a Japanese bridge has been awarded to Takata & Co., and an order for 850 tons of bridge material for erection in the vicinity of Tokio is pending. Probably the largest business pending in the Far East at present is that represented by the pipe, plates and transmission towers required

for the hydroelectric project on the island of Formosa. The contract will probably be awarded this month and will include six lines of pipe 1137 ft. long, about 1400 tons of tank plates to be bent for riveted pipe, and 225 miles of steel transmission towers, which at eight to the mile would number in the neighborhood of 1800.

Renewed activity is also reported from Chinese sources, particularly Hong Kong and Shanghai. Tin plate continues fairly active in the Orient, one New York exporter having recently booked an order for about 1000 base boxes of tin plate for a Japanese consumer. Black sheets of light gage still represent a large portion of the export business with Japan. One reason for the continued sheet demand is that dealers in Japan have received numerous lots of sheets of unsuitable quality, in some cases from Continental sources, in others from sources in the United States, and have had instructions from their customers to cancel unless satisfactory material can be delivered without delay. This has led to numerous orders of sheets for early delivery. The orders are chiefly for black sheets and in many cases these are galvanized in Japan.

For International Co-operation of Engineering Societies

Calvin W. Rice, secretary American Society of Mechanical Engineers, is chairman of a committee which is arranging for a dinner of engineers in New York, Oct. 10, in the interest of a new movement for international co-operation among engineering societies. The dinner is to mark also the return of the mission of 13 representatives of American engineering societies sent abroad to confer the John Fritz medal upon Sir Robert Hadfield and Eugene Schneider. Sir Robert Hadfield has sent a message to this country in aid of the movement which will be launched on Oct. 10. He advocates a world engineering council of Anglo-Saxons. Voicing, he says, the opinion of British engineers, Sir Robert is confident that the engineers of Great Britain and the United States are going to pull together. He has recently advocated the federation of engineering societies of the entire British Empire through an executive council similar to the American Engineering Council of the Federated American Engineering Societies.

The celebration referred to above, which will be at the Engineers' Club in New York, will be attended by engineers representing the Allied nations. Invitations have been extended to many men prominent in public life on both sides of the Atlantic.

Another Reduction Expected

Owing to wage reductions by independent competing interests, another cut is contemplated by independent iron and steel makers in the Mahoning and Shenango Valleys. Going rate for day labor in the Youngstown district is 30c. per hr., as compared with 25c. east of the Alleghenies, and 27c. paid by southern Ohio interests. When action is taken, the common labor rate in the valleys will be reduced to 27c. and rates for semi-skilled and skilled workers proportionately readjusted.

Successful generation of electric power at more than 1,000,000 volts at commercial frequencies has just been accomplished at the high voltage engineering laboratory of the Pittsfield, Mass., works of the General Electric Co. The laws of corona were checked at similar potentials and found to hold. A short transmission line was tested for corona conditions and results indicated that a line using 4-in. diameter conductors or larger would be necessary at 1,000,000 volts.

A certificate of incorporation of the Builders' Steel Co., Windsor Street, Hartford, Conn., has been filed with Connecticut authorities. The company is composed of Harry Ogens, A. Azier and S. Rome, and will engage in the structural steel business.

An agreement of the creditors to accept stock in the Mutual Truck Co., Sullivan, Ind., in exchange for their claims against the company, opens possibilities of the plant resuming operations.

Pittsburgh Iron and Steel Market

(Continued from page 761)

Available supplies are so limited that only a moderate demand is sufficient to stiffen prices. Dealers' stocks average too high to be offered at current prices and there is a marked tendency on the part of producers to hold for higher prices. The Ford Motor Co., which is reported to have 100,000 tons of scrap piled up at its works in Detroit, is said to have rejected an offer of \$150,000 for 35,000 tons of turnings, included in the stocks. This is almost \$4.50 a ton, Detroit, and equal to about \$9.50 delivered, Pittsburgh common freight points. Some consumers in this district still are trying to buy trimmings at \$8, but only stray cars which have to be moved can be bought at less than \$8.50 and on tonnages \$9 is minimum. We note sales of compressed sheets at \$11.50, bundled sheets sides and ends at \$10 and short shoveling turnings at \$10. Heavy melting steel is not available at less than \$14, at which price there was one sale of 5000 tons. Foundry grades are firm, but rerolling rails are easier, because demand for rerolled bars and light rails is so light that rerolling mills are more cautious buyers.

We quote for delivery to consumers' mills in the Pittsburgh and other districts taking the Pittsburgh freight rate, as follows:

Heavy melting steel, Steubenville, Follansbee, Brackenridge Monessen, Midland and Pittsburgh.....	\$14.00
No. 1 cast cupola size.....	\$17.00 to 17.50
Rerolling rails, Newark and Cambridge, Ohio; Cumberland, Md.; Parkersburg and Huntington, W. Va., and Franklin, Pa.....	15.50 to 16.00
Compressed sheet steel.....	11.00 to 11.50
Bundled sheet sides and ends, f.o.b. consumers' mills, Pittsburgh dist....	9.50 to 10.00
Railroad knuckles and couplers.....	14.50 to 15.25
Railroad coil and leaf springs.....	14.50 to 15.25
Railroad grate bars.....	11.00 to 11.50
Low phosphorus melting stock, bloom and billet ends, heavy plates, 1/4-in. and thicker.....	17.50 to 18.00
Railroad malleable.....	13.00 to 13.50
Iron car axles.....	20.00 to 21.00
Locomotive axles, steel.....	19.50 to 20.00
Steel car axles.....	15.00 to 15.50
Cast iron wheels.....	16.00 to 16.50
Rolled steel wheels.....	14.50 to 15.00
Machine shop turnings.....	8.75 to 9.00
Sheet bar crop ends at origin.....	13.00 to 13.50
Heavy steel axle turnings.....	10.50 to 11.00
Short shoveling turnings.....	10.00 to 10.50
Heavy breakable cast.....	15.00 to 15.50
Stove plate.....	12.00 to 12.50
Cast iron borings.....	9.00 to 9.50
No. 1 railroad wrought.....	12.00 to 12.50

Resumes on Open Shop Basis

The plant of the Whitaker-Glessner Co., Portsmouth, Ohio, which in common with all plants of the company has been down for the past two months on account of a dispute with the Amalgamated Association of Iron, Steel and Tin Workers, over the question of the open or closed shop, resumed operations last week on an open-shop basis. A portion of the open-hearth department and several finishing mills are in operation.

SHEET PRICES ADVANCED

Tonnages Accepted at Previous Levels Before Announcement—Low Bar Prices

YOUNGSTOWN, OHIO, Sept. 20.—All Valley independent interests have followed the lead of the Brier Hill Steel Co. in advancing prices on all grades of sheets. The new quotations are \$2.50 per 100 lb. for No. 10 blue annealed; \$3 for No. 28 gage black and \$4 for No. 28 gage galvanized. The Republic Iron & Steel Co. and Youngstown Sheet & Tube Co. have reduced prices of standard steel pipe \$8 per ton on all butt weld sizes, \$10 on 2 to 8-in. lap weld and \$8 on 9-in. and larger lap weld, and are otherwise following the new quotations of the National Tube Co.

The Newton Steel Co., the principal district independent producer of full-finished sheets, has reduced the price of No. 22-gage auto body stock from \$4.70 to \$4.35, the new quotation being based on \$3 black sheets. Independents in this district are generally adhering to the advanced prices on wire and nails. Where prices have been advanced, makers accepted tonnage at the previous levels to meet requirements of their customers over a period of 30 days and in some cases longer. This accounts for acceleration of sheet mill schedules to approximately 65 per cent of normal, perhaps the best productive rate at any time this year.

In other directions, prices have been firmer and there is a pronounced tendency among independent makers to stabilize the market. Still further advances in sheet prices are looked for and intimation is made that another \$5 increase may be made, especially in view of firmer prices on pig iron, heavy melting scrap and semi-finished materials.

In announcing the advanced prices of sheets, an official of the Brier Hill Co., which operates 28 sheet mills and ranks as one of the largest independent sheet makers in the country, said: "We were compelled to advance our prices because we could not manufacture sheets at the prices we were receiving. We are restoring prices to a point where there is a chance to break even."

Light Steel Products

Makers generally report a firmer demand for the lighter steel products, though the improvement is not shared by the heavier materials. It is pointed out that the market as a whole is firmer, notwithstanding the reductions in some products which had been relatively higher than others and so distinctly out of line. The whole movement is held to be in the line of stabilization, with further adjustments likely.

New business is developing in all parts of the country, report makers of metal lath, fireproofing materials, sash and products entering into both road

and building construction. In most instances, buyers demand speedy shipment, ordering against immediate requirements. A large fabricator catering to building construction states that Pittsburgh, Detroit and Boston are the most active buying centers. Another district interest is figuring on two large contracts for metal furniture, one involving \$95,000, including interior metal work.

Sheet buying has progressed since the middle of August and carload business has replaced to some extent the small orders which characterized the market most of the summer, ranging down to bundled lots. While some auto makers who did not reduce prices have trimmed their sheet specifications, the effect has not been noticeable in operations. The Ford Motor Car Co. has been a consistent buyer of sheets and strip steel, and is still taking large tonnages, though its strip requirements have shown a moderating tendency. As a result, strip departments of the principal independent makers have been curtailed within the past two weeks, some mills suspending several days each week.

What effect the price reduction in pipe may have is problematic, as makers have not looked for tonnages of lap weld in any volume until next year, due to inactivity of oil-drilling groups. Makers believe that butt weld buying, which has largely sustained production the past month, will be stimulated to some extent and that jobbers may enter the market more actively.

Rolling for Export

Several large interests report that they are now rolling more steel for export than at any time in five or six months.

The Youngstown Sheet & Tube Co. has started its 9-in. merchant bar mill on an accumulation of orders, the demand being largely for reinforcing bars and similar requirements. Very little of the tonnage is for automobile makers. The nominal price range on bars is 1.60c. to 1.65c. though business has been accepted within the past two weeks at a price which figured back to 1.50c. mill.

Increased buying of tin plate has strengthened the going price of \$5.25 on production plate, which has been consistently upheld by the principal maker in this territory. That stock plate has sold considerably lower, ranging down to \$4.75 per base box, is indicated by the bimonthly examination of sales sheets of mid-Western union mills, which disclosed an average price of \$5.

Firmer pig iron and scrap prices will result in stronger prices on semi-finished material, say makers, who predict an early advance on open-hearth sheet bars from \$30 to \$32. Heavy melting scrap is held from \$13 to \$13.50, though dealers say the range is up to \$14. Run-of-mine coal is quoted at \$3.25, while blast furnace coke is selling at \$3 in the spot market and is firm at that price.

Exports Still Declining

WASHINGTON, Sept. 10.—Exports of iron and steel for August continued to show a decline, the total for 23 of the chief products being only 73,792 tons, the lowest since January, 1909, when they amounted to approximately 68,000 tons. Radiators, scrap and horseshoes are not included in the August compilation, taken from advance figures of the Division of Statistics, Bureau of Foreign and Domestic Commerce. The exports of these products in July were: scrap, 1524 tons; horseshoes, 12; radiators, 238. Exports for August, 1920, including all of the principal products, totaled 431,484 tons, while for July, 1921, they were 86,523 tons.

Higher French Duty on Tin Plates

The London Association of Tin Plate Merchants, in a circular letter issued recently, draws attention to the serious effect the new French tariff will have upon the Welsh tin plate trade, and points out, according to the *Metal Bulletin*, London, that the French pre-war import duty was 13 francs per 100 kg., net weight, whereas the latest tariff imposed by the French authorities is 39 francs per 100 kg. gross weight plus 1.1 per

cent, of the total value of the plates. As the association points out, this duty represents approximately £10 per ton on tin plates imported into France, which is at least £2 10s. per ton more than the value of French steel bars sent into Great Britain. The association urges upon the government the seriousness of the position and suggests that manufacturers protest to the departments concerned and press for better terms. The new rates make the French duties on tin plates and black plates as follows:

Tin plates—39.00 francs per 100 kg. gross weight, plus 1.10 per cent on the total value of goods.

Black plates	Rects.	Circles
Up to 0.4 mm.....	15.40	16.80 francs per 100 kg.
0.41 to 0.6.....	14.00	15.40 francs per 100 kg.
0.61 to 1.0.....	12.60	14.90 francs per 100 kg.
1.1 mm. and thicker....	10.50	11.90 francs per 100 kg.

Plus 1.10 per cent surcharge on total value.

The French Government is protesting against the Safeguarding of Industries Act, recently passed by Great Britain on the ground that French export trade would be seriously affected by it. The new French tariff, it is believed, will have a serious effect upon South Wales, and the matter will probably be taken up by the Welsh Tin Plate Manufacturers' Association.

IRON AND INDUSTRIAL STOCKS

Further Net Gains Appear to Be Based on Something Constructive

Still further net gains were made the past week in going market values of iron and industrial stocks. The upswing was less pronounced than during the previous week, however, and was marked by more irregularity. Less than three months ago, United States Steel common was approximately \$9 a share cheaper than it is to-day, and values of a large number of other important securities have advanced as much or more. The irregularity of prices the past week might be expected under the circumstances. The success of the recent Government financing with its tremendous oversubscription is a clear indication of the growing confidence in the country's future. Evidence is at hand daily of a greater consumption of staple commodities. It is reasonable to assume that prices for such commodities will improve with consumption. The major upward movement of security values therefore appears to be based on something constructive. The volume of daily turnover in securities denotes a slightly broadening tendency of investment buying, yet it cannot be said it is general. Public investment buying at the moment appears to be attracted more to bonds and notes yielding 6 per cent or better than to common and preferred stocks.

The range of prices on active iron and industrial stocks from Monday of last week to Monday of this week was as follows:

Allis-Chalm. com.	32½ - 34½	Int. Har. com.	77½ - 82
Allis-Chalm. pf.	— - 75	Lackawanna Steel.	40 - 43
Am. Can. com.	27 - 28½	Midvale Steel.	24½ - 26½
Am. Can. pf.	— - 82	Nat. Acme.	15 - 15½
Am. C. & F. com.	126½ - 131½	Nat. E. & S. com.	34½ - 37½
Am. C. & F. pf.	108 - 111	N. Y. Air Brake.	55½ - 58½
Am. Loco. com.	89½ - 93	Nova Scotia Steel.	24½ - 25
Am. Loco. pf.	— - 104½	Press. Steel com.	59 - 60
Am. Radiator com.	— - 68½	Ry. Stl. Spg. com.	84 - 87
Am. Steel F. com.	24½ - 25½	Replogle Steel.	24½ - 26
Am. Steel F. pf.	— - 84	Republic com.	49½ - 54½
Bald. Loco. com.	87½ - 91½	Republic pf.	85 - 85½
Bald. Loco. pf.	— - 98	Sloss com.	36½ - 39½
Beth. Steel com.	51½ - 52½	Sloss pf.	— - 71
Beth. Stl. Cl. B.	54½ - 57½	Superior Steel.	31 - 33½
Beth. Stl. 8% pf.	99½ - 100½	Transue-Williams.	— - 34½
Chic. Pneu. Tool.	50 - 52½	Un. Alloy Steel.	24 - 25
Colorado Fuel.	24½ - 25	U. S. Pipe com.	15½ - 15½
Cruc. Steel com.	61 - 65½	U. S. Steel com.	77½ - 79½
Cruc. Steel pf.	82 - 84	U. S. Steel pf.	109½ - 109½
General Electric.	125 - 127½	Vanadium Steel.	32½ - 35
Gt. No. Ore Cert.	28 - 29½	Va. I. C. & Coke.	67 - 70
Gulf States Steel.	38½ - 42½	Westingh's Elec.	44 - 45½

Industrial Finance

The Laconia Car Co., Laconia, N. H., has anticipated \$200,000 8 per cent serial notes, maturing Jan. 1, 1922.

Directors of the Youngstown Sheet & Tube Co., Youngstown, Ohio, have declared a dividend of 50c. per share on the 800,000 shares of non-par value common stock outstanding, and the regular dividend of \$1.75 on preferred stock, both payable Oct. 1 to holders of record Sept. 20. It is announced that the common dividend was not earned during the third quarter and will be paid from surplus. The common payment is the same as was distributed July 1 for the second quarter.

Directors of the Brier Hill Steel Co., Youngstown, Ohio, have declared the regular preferred dividend of \$1.75 per share, payable Oct. 1 to stock of record Sept. 20. The common dividend was omitted.

Directors of the Newton Steel Co., Youngstown, Ohio, have authorized the regular preferred dividend of \$1.75 per share for the third quarter, payable Oct. 1 to stock of record Sept. 20.

The National Cash Register Co., Dayton, Ohio, has increased its capitalization from \$15,000,000 to \$30,000,000. The increase was made in the company's second preferred stock, which was raised from \$5,000,000 to \$20,000,000. Stock will be offered to present holders of second and third preferred stock, as an exchange issue. Officials of the company state that the issue is not to provide for extensions to the Dayton plant, as none are contemplated at the present time. There will be, however, approximately \$10,000,000 of the new issue left that will be available for expansion if such a course is ultimately decided upon.

J. T. Joyce, who was appointed receiver of the U. S. Auto Gear Shift Co., Eau Claire, Wis., upon filing of a voluntary petition in bankruptcy, has been elected trustee, under bond of \$10,000. Creditors will meet Oct. 1 to consider disposition of the property. Assets of \$749,258 and liabilities of \$278,424 are reported in schedules officially filed.

Office and Trade Changes

William Jessop & Sons, Inc., New York, high-speed steel, have recently opened their new office and warehouse at 112-118 North May Street, Chicago. This branch is under the management of C. V. Luin.

The Standard Steel Works has completed its new works and general offices at North Kansas City, Mo., and has removed to that city from Kansas City, Mo., its executive headquarters and present plant. This with its additional floor space, more than trebles present capacity for the manufacture of Standard steel products.

Ernest E. Lee, 115 South Dearborn Street, Chicago, has been appointed district representatives for the boiler feed regulators and pump governors of the Northern Equipment Co., Erie, Pa.

Henry Bryant & Co., Inc., 85 Oneida Street, Milwaukee, dealer in iron and steel products and waste materials, scrap metal, etc., has filed amendments to its articles, changing the corporate style to Waukesha Steel Products Co., and increasing the capital stock from \$25,000 to \$50,000. Officers of the company are: President, Henry Bryant, Waukesha, Wis.; vice-president, C. H. Doty; secretary, Helen Israel.

The Henry & Wright Mfg. Co., Hartford, Conn., machine tools, recently was reorganized with Charles J. Sorrells, C. S. Sorrells & Co., New York, president; Jonas O. Hoover, Chicago, vice-president and chairman of executive committee; Tom B. Owens, T. B. Owens & Co., New York and Ft. Worth, Texas, treasurer; Mrs. Daniel M. Wright, secretary; and Frank M. Rogers, Chicago, general manager and assistant treasurer. William G. Allen, Hartford, is superintendent and plant manager.

The T. & A. Engineering Corporation, New York, has been incorporated with a capital of \$100,000 by S. and M. Thompson, and L. Aghamalian, to manufacture automobile equipment and mechanical specialties. It is represented by C. S. Aronstam, 100 Broadway.

The Rex File Co. and the Vixen Tool Co., Newark, N. J., have been consolidated with the Heller Brothers Co., Newark, N. J., and will continue the production of files, rasps, tools and steels. Walter D. Craft, who has been secretary-treasurer of the Vixen Tool Co., will act as domestic sales manager of the consolidated companies.

The Flynn & Emrich Co., manufacturer of iron castings, Baltimore, is anxious to secure representatives in Raleigh, N. C.; Charlotte, N. C.; Columbia, S. C.; Charleston, S. C.; Knoxville, Tenn.; Indianapolis, Ind.; Little Rock, Ark.; Wichita, Kan.; Des Moines, Iowa; Memphis, Tenn., and Cincinnati.

Inquiries made of 4586 concerns in the devastated districts, according to the *Bulletin* of the French Ministry of Labor, showed that 1020 of those operating in 1914 had not re-opened by March 1, 1921; 2817 were operating partially; 749, or 16.3 per cent, had been completely restored. Compared with the force of 818,104 employees in 1914, only 381,453 were at work in 1921, a loss of 53.4 per cent.

The Massachusetts State Free Employment Office, Boston, reports that in August the number of orders from employers was 15 per cent greater than in July, but 36 per cent less than in August, 1920. The number of positions filled increased 9. The average attendance of applicants for employment was 1611, an increase of 16 per cent as compared with July. The greatest demand for labor comes from the building and wood working industries.

In addition to the pamphlets prepared by the various committees of chemists of the United States Steel Corporation, reference to which was made on page 588 in THE IRON AGE of Sept. 8, the second edition of "Sampling and Analysis of Alloy Steels" is off the press and copies may be secured in the same way and at the same charge as the other pamphlets.

At the Fore River Works, Bethlehem Shipbuilding Corporation, Ltd., Quincy, Mass., all employees, including the office force, have gone on an 8-hr. day basis with an additional 10 per cent reduction in pay. The plant for some time has been operated on a five-hr. day, five-day week schedule. No reduction in the number of employees has been made recently.

Machinery Markets and News of the Works

CONDITIONS ARE SPOTTY

Improvement in Some Markets Offset by Extreme Dullness in Others

Prospects Are Somewhat Brighter in All Sections, However, and There Are More Live Inquiries

Although more inquiries for machine tools are noted there is as yet no well-defined turn for the better in sales. In some markets, however, a fair amount of business has been done in the past week or two compared with the inactivity of recent months.

Contrasted with encouraging reports from some sections are reports of extreme dullness in others, notably New York and Chicago. The expectations of a trade revival to begin in September have not materialized so far as these market centers are concerned and the first half of this month has shown little if any improvement over August.

Municipal projects seem to offer the best prospect of early buying. Bids were opened at Philadelphia on Sept. 16 on 35 tools for a repair shop for the water works department. Camden, N. J., took bids recently

on about 40 tools for its public schools, but has taken no action yet. The Federal Government is considering the purchase of about 55 tools for the schools of Washington, D. C., but may not buy for a few months. Bids for about 25 tools for the manual training school of Canton, Ohio, were opened Sept. 16 and it is expected that the orders will be placed soon. The Board of Prison Inspectors of Pittsburgh is asking for prices on 15 tools to replace those destroyed in a fire and riot recently. The list includes lathes, milling machines, drill presses, pipe cutting machines and some woodworking machinery.

Very little new railroad business is developing. The Virginian Railroad is in the market for six tools and the Chesapeake & Ohio has received prices on eight machines. The New York Central is expected to purchase soon a large planer and a large lathe for which it inquired some weeks ago.

Among the sales of more than ordinary importance reported are six oil country lathes for shipment to Venezuela; a car wheel lathe to the Connecticut Co.; four tools to the National Safe & Lock Co., Cleveland. A report that a Western railroad had bought \$80,000 worth of tools is not confirmed.

New York

NEW YORK, Sept. 20.

The machine-tool business is still dull, there having been no improvement this month worthy of note. There are few inquiries for tools and those who do come into the market are looking for "bargains," and usually buy used machines. The New York Central Railroad is expected to close shortly on a large planer and a large lathe for which it inquired some weeks ago. The Connecticut Co., operator of street railroads, has purchased a car wheel lathe. Among recent export orders is one from an oil company for six oil country lathes to be shipped to Venezuela.

Don A. Carpenter & Co., El Paso, Tex., are in the market for two hydraulic wheel presses of 100 and 200 tons' capacity, respectively.

The market in cranes continues dull with few new inquiries of any size. The situation in hand-power cranes and hoists is much better. Among current inquiries is one from the Austin Co., Philadelphia, which was awarded the building contract by F. W. Tunell & Co., Philadelphia, glue and fertilizer. A bucket crane of about 5-tons capacity, 69-ft. span for handling a 2 to 2½-cu. yd. bucket is included in the contract. The American Sugar Refining Co., 117 Wall Street, New York, is in the market for nine motor-driven winches. The Gallup-American Coal Co., 25 Broad Street, New York, which recently inquired for a 10-ton hand-power crane, has obtained one from an associated company. Among recent sales are a 20-ton chain hoist and a 20-ton tandem trolley with I-beam sold by the Chisholm-Moore Mfg. Co. to the Lyman Stone Co., Hamburg, N. J. The 3-ton, 16-ft. span hand-power crane recently purchased by the Mayer Coating Machine Co., Rochester, N. Y., was sold by the Roeper Crane & Hoist Works.

H. F. Holbrook, Inc., West End Avenue and Sixty-seventh Street, New York, manufacturer of automobile bodies, has negotiations under way for the purchase of a one-story plant in the New York district, totaling about 120,000 sq. ft. of floor area, for the establishment of new works. It is proposed to enlarge the building to provide facilities for an annual production of about 1500 automobile bodies. H. F. Holbrook is president.

Newport Motors, Inc., New York, has been incorporated with a capital of \$500,000 by G. H. Hinman, A. Adamson and E. J. Keegan, to manufacture automobiles and parts. It is represented by W. W. Gage, 1819 Broadway.

The New York Steam Co., 280 Madison Avenue, New

York, has awarded a contract to Stone & Webster, Inc., 120 Broadway, for a new power house at Fifty-ninth Street and the East River, estimated to cost about \$400,000 with equipment.

The Inwood Consumers' Ice Mfg. Corporation, New York, has been incorporated with a capital of \$220,000 by S. C. Murray, E. Marks and N. F. Schmidt, 220 Broadway, to construct an ice-manufacturing and refrigerating plant.

The International Spectacle Corporation, New York, has been incorporated with a capital of \$50,000 by D. Hines, L. McCormick and J. L. Gorman, to manufacture electric lighting equipment and fixtures, and other electrical devices. It is represented by C. M. Rubanks, 50 Pine Street.

The Fulton Ice Co., 18 East Forty-first Street, New York, will build a new two-story plant, 50 x 207 ft., at 138-40 Cherry Street, estimated to cost about \$100,000 with machinery.

The Mohican Brass & Copper Works, New York, has been chartered under State laws to manufacture brass, aluminum, copper and other metal products. The incorporators are E. P. McIntire, E. G. Michaels and J. J. Devitt. It is represented by C. S. Lorentzen, 68 Broad Street.

The Paige-Detroit Service Co., 514 West Fifty-seventh Street, New York, has leased the building at 529 West Fifty-fifth Street for the establishment of a new automobile service and repair works.

The T. & A. Engineering Corporation, New York, has been incorporated with a capital of \$100,000 to manufacture automobile parts and equipment. M. Thompson, 189 Montague Street, Brooklyn, is the principal incorporator.

The Mason Tire & Rubber Co., 233 West Fifty-eighth Street, New York, is planning for the enlargement of its works at Kent, Ohio, to double the present capacity.

The Guy Disc Valve Motor Corporation, New York, has been incorporated under Delaware laws with capital of \$1,500,000 to manufacture automobile engines, parts, etc. It is represented by the Delaware Registration Trust Co., 900 Market Street, Wilmington, Del.

The Archer Automobile Development Co., Saratoga Springs, N. Y., has been incorporated with a capital of \$150,000 to manufacture automobile equipment, parts, etc. S. B. Archer, Saratoga Springs, is the principal incorporator.

The Hamlin Hygrostat Corporation, New York, has been incorporated with a capital of \$20,000 by J. A. Hamlin, E. Bernstein and J. T. Mulligan, to manufacture air condition-

ing equipment and other devices for atmospheric regulation. Adolph Bangser, 30 Broad Street, represents the company.

The Safety Blade Holder Co., New York, has been incorporated with a capital of \$50,000 by C. B. and J. B. John, and C. Stern, to manufacture metal holders and similar products. It is represented by Harold Flatto, 261 Broadway.

The Richelleu Motor Co., Asbury Park, N. J., manufacturer of automobiles and parts, has acquired property on Asbury Avenue as a site for a new plant. Initial buildings will be devoted to the manufacture of motors of the Duesenberg type and for assembling work. Robert G. Poole is treasurer.

The Borough Council, Essex Fells, N. J., has approved a bond issue of \$30,000, the proceeds to be used for the installation of new pumping equipment and other machinery at the municipal waterworks.

The Joseph Toye Co., 353 Bank Street, Bridgeton, N. J., has awarded a contract to the H. H. Hankins & Brothers Co., Bridgeton, for a new one-story foundry 40 x 80 ft., estimated to cost about \$14,000. The W. P. Cameron Engineering Co., Witherspoon Building, Philadelphia, is engineer and architect.

Fire, Sept. 11, destroyed a portion of the machine repair shops and engine house of the Erie Railroad, Jersey City, N. J., with loss estimated at close to \$500,000, including equipment and rolling stock. Headquarters of the company are at 50 Church Street, New York.

The Wilcox-Durand Glass Co., Newfield, N. J., has completed plans and is taking bids for a new one-story machine shop, 31 x 100 ft., for general machinery construction and repairs.

The Automatic Safety Davit Co., Highlands, N. J., has been incorporated with a capital of \$60,000 by William Fehlbauer and Harry N. Johnson, 141 Bay Avenue, Highlands, to manufacture marine equipment.

The Theodore Smith & Sons's Co., Iron Works, 76 Montgomery Street, Jersey City, N. J., manufacturer of boilers, dredging buckets, etc., has filed plans for a new two-story building at 197 Van Vorst Avenue, to cost about \$10,000.

The Florence Foundry Co., Florence, N. J., is considering the erection of a new one-story foundry, 40 x 100 ft. C. L. Reeves is superintendent.

The Bureau of Yards and Docks, Navy Department, Washington, will receive bids until Sept. 28 for extensions to the power plant at Lake Denmark, N. J., comprising boiler, air compressor, pumping machinery, electrical equipment, etc. C. W. Parks is chief of the bureau.

The Piano Hammer Joint Improvement Co., Newark, has been incorporated with a capital of \$125,000 by Jules Morel, Rudolph Strand and Joseph H. Weiser to manufacture piano mechanism equipment, piano movement joints, etc. The company is represented by Joseph Steiner, 790 Broad Street.

George C. Bergen, county purchasing agent, Room 252 Court House, Market Street, Newark, N. J., will receive bids until 11 a. m., Oct. 7, for the construction of a coal conveyor and coal storage equipment at the Essex County Hospital, Overbrook, N. J., and for the construction of an ash conveyor and ash storage tank at the Essex County Hospital for Contagious Diseases, Belleville, N. J. Runyon & Carey, 843 Broad Street, Newark, are engineers.

The Tiffany Mfg. Co., Newark, has been incorporated with a capital of \$50,000 by S. E. and Carlos W. Curtiss, and Paul J. Landemare, 784 Broad Street, to manufacture automobile equipment and supplies.

The Hewes & Phillips Iron Works, Newark, has filed notice of dissolution under State laws.

The Cortland Tire & Rubber Co., 344 Cortland Street, Belleville, N. J., manufacturer of automobile tires, has filed notice of dissolution under State laws.

The Mulberry Metal Stamping Works, 352 Mulberry Street, Newark, has filed notice of organization to manufacture metal products. William Hichman heads the company.

Philadelphia

PHILADELPHIA, Sept. 19.

Municipal projects afford the chief activity in this district. The most interest was manifested in a list of about 35 machines, bids for which were opened by the Department of Public Works, city of Philadelphia, at noon, Sept. 16. The tools are for a new repair works of the water department at Twenty-ninth and Cambria streets. From six to 10 machine tool houses bid on each machine and a wide range of prices prevailed. For instance, on a group of eight lathes the bids ranged from \$8,799 to \$19,464, though in the case of some of the lower bids the machines were not

according to specifications asked, 12 speeds having been demanded of lathes, whereas bids were turned in on lathes with but eight speeds. No purchasing has been made yet of the 40 tools demanded by the manual training schools of Camden, N. J., bids of which were opened two weeks ago. The Federal Government is testing prices with a view towards buying about 55 machines for the schools at Washington in a few months. The schools of Williamsport, Pa., opened revised bids Sept. 15 for a list of tools. School business is not popular with many houses because specifications call for the installation of machines sold as well as strict provisions incident thereto.

Two Southern railroads gave out lists. The Chesapeake & Ohio asks for eight machines "for estimating purposes only," including one 20-in. lathe, three 18-in. lathes, a bolt cutter and a pipe threader. The Virginian Railway wants about six tools, including lathes, radial drills, a bolt cutter and bushing press.

The increase in inquiries the past two weeks has changed the tone of the market from pessimism to optimism.

The following is the range of prices bid on the principal machines for the city of Philadelphia: One 30-in. x 11 1/4 ft. centers, geared head engine lathe, single pulley drive, \$2,964 to \$5,165; eight 20-in. x 9 1/2 ft. centers, geared head lathes, \$8,799 to \$19,464 for the group; one 2 1/4-in. geared head turret lathe, \$2,244 to \$3,679; one 15-in. brass lathe, \$835 to \$1,390; one 5-ft. plain radial and one 2-ft. plain radial, \$3,400 to \$5,474 for both; one 30-in. vertical sliding head drill press, single pulley drive, \$636 to \$1,640; one horizontal boring machine, 3/4-in. bar, \$6,430 to \$7,755; one 24-in. and one 16-in. back geared crank shaper, \$1,685 to \$2,990 for both; one No. 2 universal geared head milling machine, \$1,418 to \$2,823; one 30 in. x 30 in. x 7 ft. planer, belted motor drive, with three heads, \$3,505 to \$4,860; one 34-in. vertical boring mill with turret head, \$2,580 to \$3,730; one single head bolt threading machine, 2 in. capacity, belt drive, \$1,098 to \$1,180; one 40-ton hydraulic press, \$935 to \$1,824; one 2-in. drill grinder, \$135 to \$1,350; one No. 2 Knight combined milling and drilling machine, \$665 to \$1,300; one 1/2-in. capacity sensitive drill press, \$180 to \$350; two air hammers, equivalent to No. 4 B and No. 1 B, Nazel, \$2,104 to \$3,450 for both; one 15-ton crane, \$4,672 to \$5,850.

Specifications for two 20-ton cranes for the transit department of the city of Philadelphia were made public today.

The Haverford Cycle Co., 503 Market Street, Philadelphia, manufacturer of bicycles and parts, has acquired the property of the Ace Motor Corporation, Erie Avenue and Sepviva Street, manufacturer of similar products, from the receivers for \$500,000. The plant and assets of the Ace company will be used by the new owner for general expansion. Max M. Sladkin is president.

The Collins Carriage Co., Philadelphia, has leased the building at 158-62 North Twenty-second Street, for the establishment of a new body building plant.

The Bureau of Water, City Hall, Philadelphia, has commenced excavations for its new one-story machine and repair shop, 160x200 ft., to cost about \$115,000, including machinery. C. E. Davis is director of the department.

Fire, Sept. 14, destroyed a portion of the Point Breeze plant of the Atlantic Refining Co., Passyunk Avenue, Philadelphia, with loss reported at about \$100,000, including oil equipment, etc.

L. M. Davis, 1616-18 Chancellor Street, Philadelphia, will build a two and three-story addition to his automobile service and repair plant, 60x60 ft., estimated to cost about \$80,000. Plans have been prepared.

The Mercer Motors Co., Trenton, N. J., manufacturer of automobiles, has disposed of a note issue of \$2,000,000 and bonds in the amount of \$500,000, the proceeds to be used for general operations and expansion. Following the recent separation from Hares' Motors, Inc., the company has perfected arrangements for immediate production. Theodore E. A. Barthel has been elected vice-president and treasurer, and George L. Catlin, assistant treasurer and secretary. J. W. MacMorris is general plant superintendent.

The Corweg Shuttle Valve Motors Co., Atlantic City, N. J., has plans under way for new works for automobile assembling, repairs and testing. It will be three stories, 100x200 ft., and is estimated to cost about \$200,000. Harry M. Velx, 738 Broad Street, Newark, N. J., is architect.

Fire, Sept. 10, destroyed the plant of the Lackawanna Cutlery Co., Nicholson, Pa., manufacturer of knives and other cutlery, with loss estimated at \$75,000.

The Lehigh Valley Railroad Co., Wilkes-Barre, Pa., is planning to replace present steam power equipment with electrical machinery at its frog shops at Weatherly, Pa.

The Warren Light & Power Co., Scranton, Pa., has arranged for a bond issue of \$212,500 and stock issue of \$30,000, the proceeds to be used for general operations and extensions.

Fire, Sept. 9, destroyed the electric pumping plant of the Berwick Water Co., Berwick, Pa., with loss estimated at about \$100,000, including pumps, motors and other equipment. It will be rebuilt.

The Blair Ice & Cold Storage Co., of Hollidaysburg, Pa., recently organized with a capital of \$100,000, is arranging for the erection of a new four-story plant. G. B. Miller, 1112 Allegheny Avenue, is president.

J. F. Richards, Nanticoke, Pa., will commence the immediate erection of a new machine shop and foundry, estimated to cost about \$100,000, including equipment.

The Sayre Electric Co., Sayre, Pa., has arranged for a stock issue of \$311,000, the proceeds to be used for extensions and general operations.

The Electric Manganese Steel Co., Reading, Pa., has been incorporated with a capital of \$75,000 to manufacture steel products. Ray A. Houck, 117 West Windsor Street, is treasurer.

The Vulcaweld Rubber Co., Pottstown, Pa., has plans under way for rebuilding its tire manufacturing plant, destroyed by fire several months ago. Recently it has been manufacturing its tires and tubes at a plant at Armstrong, N. J.

The Carbon Battery & Electric Co., Lansford, Pa., has been chartered under State laws to manufacture electrical equipment. Milton Kleckner, Lansford, is treasurer.

New England

BOSTON, Sept. 19.

Sales of machine tools the past week include a new 800-lb. special designed drop hammer to a Massachusetts textile machinery maker; a large used Bausch multiple drill to a maker of pipe fittings for a Canadian subsidiary; new Whitcomb planer to William Hardy & Sons, Fitchburg, Mass., brass screw plates, this firm not having covered on its full machine tool requirements; four new hand milling machines to a New Hampshire maker of textile machinery accessories which recently closed on special profiling equipment; one 18 in. x 8 ft. and one 14 in. x 6 ft. used engine lathes to two local concerns; a used 14-in. lathe and a disk grinder to a Massachusetts street railroad company; new riveting machinery and a used Barnes geared drill to two Boston firms; small drilling equipment to a Lynn, Mass., manufacturer, and truck equipment for handling ladles to the Gilbert & Barker Mfg. Co., West Springfield, Mass.

While the range of tools involved is fairly wide and companies purchasing represent diversified interests, business was not as good as generally expected. Dealers, especially those handling used as well as new machinery, have been unable to close on numerous prospective orders, and indications are that some of these will not be purchased in the near future, due to the inability of purchasing agents to obtain appropriations. On the other hand, buyers have signified their intention of covering on some needed equipment before long. Two of the largest machine tool interests, having closed on prospects the past two or three weeks, report little indication of new business.

The Maine Central Railroad has definitely decided to abandon inquiries on three fairly large machines for one of its repair shops, having substituted machinery heretofore used elsewhere. It is reported the General Electric Co. also has transferred equipment from subsidiary plants to its West Lynn, Mass., works rather than purchase new tools at this time. The Boston & Albany Railroad has done nothing toward purchasing a 2500-lb. single frame steam hammer needed at West Springfield shops. The city of Boston has not covered on its gear driven universal milling machine. The lowest bid submitted was \$1,400. The Power Construction Co., Worcester, Mass., has postponed purchasing crane requirements, but it is anticipated Stone & Webster will close on the Ford, Green Island, cranes in the near future.

The National Acme Co., automatic screw machines and products, is to have an exhibit at the Eastern States Fair to be held this month at Springfield, Mass.

Isaac E. Sexton, Winchester, Mass., is president and Perley C. Rogers, 53 Gerard Street, Roxbury, Mass., treasurer of the Roxbury Steel Casting Co., Boston, capitalized for \$50,000, recently granted a Massachusetts charter.

The Richard French Iron Works, formerly of Worcester, Mass., recently was reorganized with a capital of \$70,000. It will erect a one-story plant, 65x150 ft., in Millbury, Mass., at a cost of \$25,000. Raymond Tracy is president; George C. Bell, vice-president, and Alexander V. Campbell, treasurer.

The Rex Top & Body Co., 388 Newbury Street, Boston, manufacturer of automobile bodies, etc., has been acquired by Paul L. Pryor and James F. Malone. It will be continued in operation with Mr. Pryor as president, and Mr. Malone, treasurer.

The Providence Radiator & Electric Heating Corporation, Providence, R. I., has been incorporated under Delaware laws with capital of \$2,000,000 to manufacture electrical and mechanical products. The incorporators are Daniel Owen, P. S. Howland and M. A. Colter, Boston. It is represented by the Delaware Registration Trust Co., 900 Market Street, Wilmington, Del.

The Hampden Tool Co., Springfield, Mass., has awarded contract for a new one-story factory on St. James Avenue, 40x100 ft., estimated to cost \$12,000. Plans have been filed.

The Builders' Steel Co., Hartford, Conn., has been incorporated with a capital of \$50,000 by Samuel Rome, Abram Azia and Harry Ogens, 172 Belden Street, to manufacture iron and steel products.

The K. B. Noble Co., 249 Pearl Street, Hartford, Conn., manufacturer of contractors' machinery, has filed plans for an addition, estimated to cost about \$30,000.

The Wopeco Machine Co., New Haven, Conn., has been incorporated with a capital of \$60,000 by W. S. Perry, J. W. Commerford and G. H. Woodruff, 902 Chapel street, to manufacture shear grinding machines, can-opening machinery, parts, etc.

The Middlesex Machine Co., Middletown, Conn., is arranging for the early operation of its new plant at 686 Windsor Street, for the manufacture of grinding machinery, parts, etc., following its recent acquisition by the New Haven Sherardizing Co., Hartford, Conn. In the future, the company will be known as the Middlesex Machine Division of the New Haven Sherardizing Co. Plans are being perfected for increased production. F. A. Brassill is chief engineer in charge.

The Hartford Grinding Co., 236 Albany Avenue, Hartford, has filed notice of organization to manufacture grinding equipment. Maurice Millard, 25 Seyms Street, heads the company.

W. L. Hayes, Hartford, Conn., has filed plans for a new one-story forge shop on Albany Avenue.

The United Illuminating Co., Bridgeport, Conn., will install a machine shop in connection with its new generating plant, now in course of erection at the foot of East Main Street. It will be equipped for electric machinery repairs, parts manufacture, etc.

Buffalo

BUFFALO, Sept. 19.

The Niagara Falls Felt & Paper Co., Niagara Falls, N. Y., a subsidiary of the Niagara Falls Power Co., Canal Basin, has awarded contract to the Read & Coddington Engineering Co., 238 Portage Road, for a new plant on Sugar Street, estimated to cost about \$300,000 with machinery.

The Standard Thermometer Co., Cleveland, N. Y., has been incorporated with a capital of \$25,000 by W. G. Hamilton, J. Happle and J. G. Boyd, to manufacture thermometers and other measuring instruments. Jacob G. Smith, First National Bank Building, Syracuse, N. Y., represents the company.

The Corning Foundry Co., Corning, N. Y., has filed notice of dissolution under State laws.

The New York Central Railroad Co., Grand Central Terminal, New York, will build a new coaling plant at Wayneport, N. Y.

The Syracuse Lighting Co., Syracuse, N. Y., has arranged for an increase in capital stock from \$4,000,000 to \$5,000,000, the proceeds to be used for extensions and general operations, etc.

The W. & J. Carson Co., Buffalo, has been chartered under State laws to manufacture automobile equipment and accessories. The incorporators are W. J. and J. C. Carson, and L. R. Anthony. It is represented by Kent, Cummings & Means, Dun Building.

Cleveland

CLEVELAND, Sept. 19.

The improvement in the machine-tool market that many manufacturers and dealers looked for this month has as yet failed to materialize. Dealers continue to book a few orders, mostly for single machines. Buyers as a rule are the smaller machine shops. Some machine tool builders report a fair amount of orders in prospect from companies which will need additional machine tools as soon as their business picks up. New bids for about 25 machines for the manual training department of the McKinley School, Canton, were opened Sept. 16, and it is expected that this business will be placed shortly. Orders for two machines, a horizontal boring mill and a milling machine, have been placed by the National Safe & Lock Co., Cleveland.

The Kelley Island Lime & Transportation Co. has placed an order with the Cleveland Crane & Engineering Co. for a 10-ton crane with a 40-ton bridge and a 5-ton auxiliary. This inquiry had been pending for some time.

Operating conditions in Ohio foundries show little improvement. The last reports received by the Ohio State Foundrymen's Association indicate that average operations were 16.6 per cent of capacity and September is not expected to show much gain.

The Columbia Metal Stamping Co., 1538 East Forty-ninth Street, Cleveland, has been reorganized and its name has been changed to the Columbia Metal Stamping & Die Co. No change will be made in the line of products. The new officers are F. C. Koch, president; A. E. Koch, vice-president, and Frances Koch, secretary.

The Ohio Steel Castings Co., Cleveland, has been organized to take over the local plant of the Aetna Steel Castings Co., 2284 Scranton Road, which went into bankruptcy some time ago. The new company has been incorporated with a capital of 1000 shares of no par common stock. John W. Thompson is president and treasurer; C. S. Fenton, vice-president; Harry Greshen, general manager, and John A. Elden, secretary.

The Zerk Lubricator Corporation, recently organized, has acquired a portion of the plant formerly occupied by the Richard Automobile Co., 7800 Finney Avenue, South-east, Cleveland, and is placing it in operation for the manufacture of lubricating systems for automobiles and machine tools. Some new equipment has been purchased.

The Twin Dry Cell Battery Co., Cleveland, has purchased the plant of the Guide Motor Lamp Co., 11400 Madison Avenue, Cleveland. It is being remodeled and some new equipment installed.

The City Council, Ashtabula, Ohio, has plans nearing completion for its new municipal electric power plant, estimated to cost about \$400,000. Stone & Webster, 147 Milk Street, Boston, are engineers. M. H. Turner is city manager.

The Willys-Overland Co., Toledo, Ohio, is arranging for a bond issue of \$20,000,000, the proceeds to be used for general operations and financing, plant extensions and improvements for increased automobile production.

Chicago

CHICAGO, Sept. 19.

Most dealers report that business is as quiet as at any time this year. The tendency toward a revival in interest on the part of the buyers which seemed to be developing in August, is no longer in evidence and the first half of September has been decidedly dull. Although there are signs of improved operations among some machine tool users, there is as yet no well-defined turn for the better. Here and there are shops which are fairly busy on automotive or railroad work, but there are as many which have little or nothing to do. The chief present interest in machine tools is in used equipment, but even this is not moving fast. Prospective buyers of used tools are discovered only after a careful canvass by sales forces and even when found they are hard to sell.

At a recent auction sale of the equipment of the Sundstrom Mfg. Co., Chicago, machines were sold at about one-third of list and, in some cases, for less. Purchases by users were in the minority and the lack of active competition in the bids was evident in the prices obtained. For example, a relatively new Lodge & Shipley 24 in. x 14 ft. geared head motor-driven engine lathe with 10-hp. motor, sold for \$925. A No. 2½ Rockford universal milling machine brought \$900 and a No. 70 Heald internal grinding machine with extra internal spindle was bought at \$600.

Building permits in Chicago for the week ended Sept. 15 numbered 251 as compared with 109 for the same week in 1920. The frontage covered by the 1921 permits was 6895 ft. as against 3006 ft. for the corresponding period a year ago. Construction activity is confined principally to dwelling houses, there being little industrial building.

The W. H. Schroff Fuel Oil Burner Co., 5076 Lincoln Avenue, Chicago, has been incorporated with \$2,500 capital stock by C. V. Kellogg, Fred B. Fiz and William H. Schroff to manufacture small industrial and residential oil burners.

Breeze & Bettle, 112 West Adams Street, Chicago, have been incorporated with \$20,000 capital stock by C. J. Levey, Griscom Bettle and J. L. Breeze, Jr., to manufacture small boilers for household use, particularly adapted to oil burning. For the present the boilers are being built by the National Machine Co. Griscom Bettle is president and J. A. Murray, secretary.

The Great Western Stamping Works, Sioux Falls, S. D., was recently incorporated by local business men to manufacture novelties, such as paring knives and lamps. C. F.

Hoffman is the inventor of a number of articles which will be made in the new plant.

The Decatur Furnace & Foundry Co., manufacturer of the "Wonder" domestic heating furnace, Decatur, Ill., has taken over the foundry of the McLaughlin company, in East Cerro Gordo Street, and will expand its output.

The Chicago Store & Office Fixture Co., 818 South Clinton Street, Chicago, has purchased the block bounded by Grand, Trumbull, Augusta and Homan avenues, and will erect a three-story plant to cost \$150,000.

Henry Yerkey, Viola, Ill., has begun excavating for a new machine shop, 30x40 ft., to be erected adjacent to his garage.

The Knox Engineering Co., Roanoke, Ind., manufacturer of governors for Fordson tractors, will move to a 7-acre tract in Columbia City, south of the Columbia Iron Works, where it will erect a machine shop. The first unit will be 50x150 ft.

Fire recently did \$8,000 damage to the plant of the Rogers Foundry & Mfg. Co., Eleventh Street and Pearl Avenue, Joplin, Mo.

Spingold & Son, 750 Taylor Street, Chicago, are receiving bids through A. V. Capraro, architect, 105 North Clark Street, on a two-story garage, 75x120 ft., 1918 South Morgan Street, to cost \$50,000.

Chalmers & Williams, Inc., 208 South La Salle Street, Chicago, has started construction on a one-story addition to its plant at Chicago Heights, Ill., to cost \$50,000. It manufactures mining machinery.

The Sheffield Foundry Co., 2020 Herndon Street, Chicago, will make extensions and improvements in its one-story plant to cost about \$12,000. Carl O. Kuehne, 1572 North Halsted Street, is architect.

The North American Car Co., 328 South La Salle Street, Chicago, is completing plans for a new one-story car erection shop, 80x120 ft., at 135th Street and California Avenue, Blue Island, Ill., estimated to cost about \$40,000. Bids will be taken soon.

The Chicago & Northwestern Railway Co., 226 West Jackson Boulevard, Chicago, is considering the erection of new repair shops at Winona, Minn., estimated to cost about \$200,000, including yard improvements.

The Great Western Auto. Co., 22 East Michigan Street, Duluth, Minn., has awarded a contract to Jacobson Brothers, Columbia Building, for a new two-story service, repair and parts manufacturing plant, 100x140 ft., at 2533 Superior Street, estimated to cost about \$115,000. Carl E. Nystrom, Palladio Building, is architect.

Detroit

DETROIT, Sept. 19.

The Detroit Trailer Co. has a contract for 50 four-wheel 5-ton trailers for Brazil. The Mansfield Steel Corporation, Detroit, has the order for 97 steel combination bodies for the trucks and trailers.

The Northern Engineering Works, Detroit, reports the sale of two 5-ton type "E" electric traveling cranes of about 30-ft. span to the Philadelphia Rapid Transit Co. These cranes are of the double hook type and were sold through the company's Philadelphia office.

Construction of a sawtooth manufacturing building, 240x300 ft., has been started by the Oakland Motor Car Co., Pontiac, Mich., a subsidiary of the General Motors Corporation.

The Wales Co., Kalamazoo, Mich., has leased the plant of Dewing & Son, on the Michigan Central Railroad, for larger quarters and better shipping facilities. It manufactures gas heating appliances.

The New-Way Motor Co., Lansing, Mich., has received an order from the Portable Machinery Co., Passaic, N. J., for the immediate delivery of 80 stationary engines at \$275 each.

The Self-Lock Nut Co., Constantine, Mich., has been incorporated with a capital of \$25,000 by A. E. Trachsel, Constantine, and E. L. Trachsel, Ann Arbor, Mich., to manufacture special lock-nuts and other mechanical devices.

The Rickenbacker Motor Co., 1551 Harper avenue, Detroit, recently organized to manufacture automobiles, has preliminary plans under way for a one and two-story plant for initial production. H. L. Cunningham is in charge.

The Parcol Industries, Inc., Alpena, Mich., has been incorporated with a capital of \$50,000 by H. H. Campbell, George K. Parsons, Alpena, and H. J. Collins, Pontiac, Mich., to manufacture electrical appliances and equipment.

The B. B. M. Ice & Refrigerating Machine Co., incorporated under Delaware laws with capital of \$225,000, has filed notice of organization to operate a plant at De-

troit for its machinery manufacture. Henry J. Berry, 702 St. Antoine Street, Detroit, is vice-president.

The Northern Auto Co., Petoskey, Mich., has plans under way for a new two-story works, 120x204 ft., estimated to cost about \$80,000. Smith, Hinckman & Grylls, Washington Arcade Building, Detroit, are architects.

Cincinnati

CINCINNATI, Sept. 19.

An improvement is reported in the demand for used equipment the past week, but orders for new tools still are light. No new lists have been issued and inquiries are confined to single machines. A report was current that a Western railroad had bought approximately \$80,000 worth of tools from a local manufacturer, but this has not been confirmed. Several propositions are before the trade which call for a number of tools, but as these have been hanging fire for some time it is not expected that they will develop into orders within the next few weeks. A Chicago dealer in new and second-hand machinery is said to have bought a number of used tools from local manufacturers the past week. The same dealer is also reported to have placed a sizable order for new tools with an Indiana manufacturer. Sentiment in the trade is vastly improved and while manufacturers admit that order books are not showing great improvement, they are very optimistic regarding the future.

The Buckeye Body Co., Columbus, Ohio, has taken over the property of the Immel Co., automobile and body manufacturer. The new company is composed of former stockholders of the Immel Co., who purchased the plant at a receiver's sale. J. W. Dinsmore is president.

The Miami Iron & Steel Co., Dayton, Ohio, has taken over the property of the S. T. & G. A. Gebhart Co., which has been in the hands of a receiver for some time. The new company is capitalized at \$50,000. John A. Thiele is president and treasurer.

The Dayton Aluminum Mfg. Co., Dayton, has increased its capitalization from \$10,000 to \$50,000. It was recently amalgamated with the Consolidated Mfg. Co., and operations will be carried on in the plant of the latter company at 28 North Canal Street. The company plans an expansion of its business of manufacturing aluminum cooking utensils.

The Central Cold Storage & Warehouse Co., Cincinnati, has acquired an existing building on Elm Street for a new cold storage plant. It will be remodeled and equipped at a cost of \$200,000.

The Star Ice & Storage Co., Zanesville, Ohio, is completing plans for a new one-story cold storage and refrigerating plant on Fountain Alley, estimated to cost about \$50,000. The George B. Bright Co., 103 Marquette Building, Detroit, is architect and engineer.

Pittsburgh

PITTSBURGH, Sept. 19.

Although actual business is still of small proportions, inquiries are increasing and it is expected that orders soon will materialize. The Board of Prison Inspectors has asked for bids on 15 tools to replace those destroyed in the riot and fire several weeks ago at the Western Penitentiary, Pittsburgh, N. S. The list includes one 20-in. lathe, one 30-in. planer, 24-in. shaper, 31-in. drill, 20-in. drill, 16-in. grinder, 10-in. grinder, one No. 3 universal miller, double end punch and shear, one ripping and cutoff saw, one matcher and molder, band saw, 30-in. pattern making lathe, motor-driven electric blower and one 6-in. power pipe machine. Bids should be directed to the Board of Prison Inspectors and marked attention of E. D. Wheeler, purchasing agent. Machine-tool dealers report the sale of a fair number of machines out of stock and an occasional order which has to be supplied by the makers. Among the latter was a 48-in. roll lathe. Business in cranes still is better in the prospective than in the actual. One company is figuring on 34 semi-portable cargo handling cranes for the city of New York, to be rented to and installed at the docks of the Pan-American Terminal Co. Formal specifications have been issued and an award is expected by Oct. 1. In electrical equipment is noted the purchase from the Crocker-Wheeler Co., Ampere, N. J., by the Universal Steel Co., Bridgeville, Pa., of one 600-hp. 250 volt, direct current mill motor and one 750-hp. alternating current mill motor.

The National Mining Co., Monongahela, Pa., has been granted permission to build a new tippie at its Star mine. Plans will be prepared at once.

Property of the Pittsburgh Metal Spinning & Stamping Co., 821-23 Locust Street, Pittsburgh, will be offered for sale by the receiver for the company, the Potter Title & Trust

Co., on Sept. 30. It consists of a three-story building, fully equipped for the manufacture of metal products.

The Condon Bearing & Supply Co., Pittsburgh, is being organized by B. J. Condon, C. B. Williams and P. B. Riale, to manufacture machine bearings and operate a general machine repair works. Application for a State charter will be made on Oct. 11. The company is represented by Dalzell, Fisher & Dalzell, 450 Fourth Avenue.

The West Penn Power Co., Pittsburgh, has arranged for a bond issue of \$3,022,000, for extensions and improvements.

Fire, Sept. 14, destroyed a portion of the plant of the Carnegie Cooperage Co., Second Avenue and First Street, Carnegie, Pa., with loss estimated at \$75,000, including machinery.

The Sanitary Collapsible Barrel Co., Apollo, Pa., has broken ground for its proposed new plant, 50x160 ft., to cost about \$42,000.

The Star Glass Co., Morgantown, W. Va., has completed plans for a new plant, estimated to cost about \$225,000 with machinery, to replace its former works, destroyed by fire. The main factory will be 45x500 ft., supplemented with two one-story buildings, each 50x150 ft., and other structures, including machine shop, cooper shop, power house and office building. Louis Kauffield is manager.

The Appalachian Power Co., Bluefield, W. Va., has arranged for a bond issue of \$2,500,000, the proceeds to be used for extensions, improvements, etc. C. N. Mason is vice-president.

The Kentucky & West Virginia Power Co., 30 Church Street, New York, has awarded a contract to the Foundation Co., 120 Liberty street, for the buildings to be erected at its generating plant at Logan, W. Va., estimated to cost about \$1,500,000. The work will consist of an addition to the turbine department; boiler department, with installation of new underfeed stokers; switching station, etc. Francis R. Weller, 408 Hibbs Building, Washington, is engineer.

The E. P. Bailey Co., Nitro, W. Va., has completed plans for a new one-story foundry and machine shop, estimated to cost \$100,000 with equipment.

The Waugh Foundry & Machine Works, Inc., Williamson, W. Va., has been incorporated with a capital of \$50,000 by C. S. Waugh, W. P. T. Varney and J. T. Johnson, Williamson, to manufacture machinery, castings, etc.

Baltimore

BALTIMORE, Sept. 19.

The Chapman Self Locking Nut Co., 721 Equitable Building, Baltimore, is being organized to manufacture a self-locking nut for use on railroad tracks, etc., patented by H. D. Chapman. It is planned to capitalize at \$1,000,000 and establish local works.

The Miners' Coal Co., Steyer, Md., recently organized with a capital of \$500,000, is planning for the installation of electrical and mechanical equipment at its properties. A power house and pumping plant will also be erected. G. J. Lee is president, and M. C. Walker, secretary.

The Philipp-Kell Co., Inc., Holliday and Centre streets, Baltimore, manufacturer of sheet metal products, will soon commence the erection of a new plant estimated to cost about \$50,000.

The Lee Silver Mfg. Co., 223-25 North Holliday street, Baltimore, has been chartered under State laws to manufacture iron castings, tools, implements, etc. The incorporators are Lee Silver, S. Hyatt and I. William Schimmel.

The Bureau of Yards and Docks, Navy Department, Washington, will take bids until Sept. 28, for extensions and improvements in the power plant at Annapolis, Md.

Conveying equipment, transmission apparatus, electric motors, etc., will be installed in the new plant to be constructed by the Western Maryland Dairy Co., Linden Avenue and Dolphin Street, Baltimore. Bids will be asked about Oct. 1.

The Brooklyn Cooperage Co., Baltimore, a subsidiary of the American Sugar Refining Co., has plans under way for a new plant in the Brooklyn district to cost about \$300,000, including machinery.

The Norfolk & Western Railway Co., Roanoke, Va., will commence the immediate erection of a new repair shop and engine house at East Radford, Va.

The Insulation & Specialty Corporation of America, Wilmington, Del., recently organized with a capital of \$500,000, has leased offices at 3154 duPont Building, and is selecting a site for the erection of a plant to manufacture fiber products. Paul C. Hennig, head of the new company, formerly connected with the Continental Fibre Co., Newark, Del., and the American Vulcanizer Fiber Co., Wilmington.

Heaters & Freezers, Inc., Wilmington, has been incorporated with a capital of \$40,000 to manufacture heating equipment, refrigerating apparatus, etc. It is represented by the Corporation Trust Co. of America, duPont Building.

The Vacuumer Mfg. Corporation, Columbus, Ga., has been incorporated with a capital of \$500,000 by B. Crawford Jenkins, James H. Farish and J. J. Albright, Columbus, to manufacture measuring instruments and other precision equipment.

To carry out the details of its proposed new steel and iron works at Hancock, Md., the Hancock Steel Co., Martinsburg, W. Va., has arranged for an increase in capital from \$500,000 to \$3,500,000. It has about 20 acres and will soon commence the erection of the initial units, estimated to cost about \$200,000. The ultimate plant will give employment to about 1500. Ernest McGeorge, 1900 Euclid Building, Cleveland, is engineer; F. Vernon Aken heads the company.

Fire, Sept. 10, destroyed a portion of the steel fabricating plant of the Virginia Bridge Corporation, Alexandria, Va., and included property of the Dominion Glass Works and the Mutual Ice Co., with total loss estimated at \$350,000.

The Board of Directors, Southwestern State Hospital, Marion, Va., has plans under way for the erection of a new power house. Eubank & Caldwell, Express Building, Roanoke, Va., are architects.

The Holt Power-Light Co., Wilmington, Del., has been incorporated with a capital of \$2,000,000 to manufacture isolated electric lighting plants. It is represented by the Delaware Registration Trust Co., 900 Market Street.

The Texas Co., Houston, Tex., and 17 Battery Place, New York, is considering the erection of a new oil refinery at Portsmouth, Va.

Milwaukee

MILWAUKEE, Sept. 19.

While machine-tool sales the first half of September were hardly of an extent justifying the word volume, nevertheless more real business developed than for the same periods of July and August. Current inquiry is fairly active, but offers nothing notable in the size of prospective purchases. Demand is limited to one or two tools which usually are wanted immediately. Production of tools in Milwaukee and vicinity has not yet been resumed on an appreciable scale.

The Smith Engineering Works, Milwaukee, manufacturer of ore, rock and gravel handling machinery, has broken ground for a one-story brick and steel addition at Thirty-second and Locust streets, 75 x 100 ft., to cost about \$45,000 equipped. The general contract has been placed with the Worden-Allen Co. Charles F. Smith is president and treasurer.

The Gauger-Johnson Mfg. Co., Milwaukee, has been incorporated with a capital stock of \$25,000 to manufacture machinery. The principals are F. A. Gauger, H. W. Landwehr and R. W. Johnson, 733 Thirty-first Street.

The Electric Welding & Mfg. Co., 145 Clinton Street, Milwaukee, has changed its name to the Welded Products Mfg. Co. to better designate the nature of its business. The principal officers are Oscar Greulich, president, and George F. Luehring, secretary and treasurer.

The Milwaukee department of public works will take bids about Oct. 1 for a brick and steel building, 50 x 125 ft., one story and basement, at Clinton and Florida streets, to be used for cast iron pipe storage. Some power and hand crane equipment will be required, but details are not yet available. C. E. L. Mallig, City Hall, is engineer in charge.

The Five Ball Spark Plug Co., Milwaukee, has been incorporated with a capital stock of \$100,000 and will lease or build a plant for the production of patented spark plugs for internal combustion engines. The incorporators are Louis Neeb, A. J. Schneider and E. C. Kahn, 4129 Highland Boulevard, Milwaukee.

The Van Buren Garage Co., 174 Ogden Avenue, Milwaukee, has let the general contract to the Robert L. Reisinger Co., 464 Oakland Avenue, local, for a brick, steel and concrete garage and machine shop, 60 x 130 ft., two stories and part basement, at Martin and Van Buren streets, to cost about \$40,000 with equipment. T. M. Ackerman is president.

The Board of Education, Cudahy, Wis., has decided to purchase a site and secure plans and specifications for a new high school with vocational training facilities to cost approximately \$150,000. An architect has not yet been selected. F. H. Williamson, 505 Van Norman Avenue, Cudahy, is president of the board.

Thor Rosten, 613 Williamson Street, Madison, Wis., manufacturer of special tools, dies, fixtures, jigs, etc., will build a new shop, 40 x 90 ft., to cost about \$15,000. Work will begin immediately.

The Kiel Woodenware Co., Kiel, Wis., which serves the city and industrial and domestic consumers with electric current, will build an addition to the power plant and is in the market for additional generating transformer and other equipment.

The Northwest Engineering Co., Green Bay, Wis., which is building industrial, logging and yard cranes mounted on tank type tractor chassis, has incorporated with a capital stock of \$400,000 preferred and 1000 shares of common stock without par value. The incorporators are Victor Minahan, Sr., Joseph Z. Finzel, and Victor I. Minahan, Jr., all of Green Bay.

The Standard Unit Parts Corporation of Chicago, an Illinois corporation capitalized at \$100,000, has been granted a charter to operate in Wisconsin. Branch offices and shop are to be established in Milwaukee, with an investment of \$15,000. It manufactures metal specialties, particularly for motor vehicles.

The Foster Construction Co., 114 Grand Avenue, Milwaukee, has taken the general contract for the erection of a new high school costing \$300,000 for the city of Munising, Mich., to contain a manual training department. The architect is John D. Chubb, 109 North Dearborn Street, Chicago.

Brunett's Heating System, Inc., of Minneapolis, organized in Minnesota several months ago with \$1,200,000 capital stock to manufacture heating devices, especially for farms and isolated places, has acquired a site at Rice Lake, Wis., and started work Sept. 15 on the erection of a plant to cost about \$75,000 for the initial unit. The principals are D. A. Brunett and H. A. Swenson, Minneapolis, and A. F. Thelander, Rice Lake.

The Peterson Estate, Soldiers Grove, Wis., will rebuild its power dam and hydroelectric generating plant on the Kickapoo River at a cost of approximately \$50,000 and has engaged E. E. Dillion, Washington Building, Madison, Wis., as consulting and contracting engineer. Clarence Peterson is manager of the estate.

The F. Rosenberg Elevator Co., 174 Reed Street, Milwaukee, has awarded the general contract to the Rauff Co., 53 Patton Building, local, for its new plant at Franklin and Becker streets and the Chicago, Milwaukee and St. Paul Railroad tracks. It will be of brick and steel, one story, 120 x 233 ft., and with equipment will cost about \$100,000. The architects are Martin Tullgren & Sons, 425 East Water Street.

The Central South

ST. LOUIS, Sept. 19.

The Missouri Pacific Railroad Co., Railway Exchange Building, St. Louis, has completed plans for six new locomotive repair shops at different points. The largest structure will be one-story, 45 x 400 ft., and the five other shops, 44 x 240 ft. E. A. Hadley is chief engineer.

The Banner Fork Coal Co., Kentonia, Ky., is planning the construction of a new power house at its properties, with the installation of new electric haulage and operating equipment at the mines.

The Riverside Brick & Tile Co., Knoxville, Tenn., has been incorporated with a capital of \$40,000 by R. P. Black, B. C. Ogle and J. W. Dooley, Knoxville, to manufacture brick, tile, etc.

The Klanke Machine Co., Muskogee, Okla., has been chartered under State laws to manufacture machinery and parts. The incorporators are E. E. Klanke, James E. Whiteside and Glenn Alcorn, all of Muskogee.

The Buick Motor Co., Flint, Mich., is having plans prepared for a new service and repair building at Memphis, Tenn., two stories, 100 x 225 ft., estimated to cost close to \$90,000. W. C. Lester, 636 News-Scimitar Building, Memphis, is architect.

The Hillman Syndicate, Bowling Green, Ky., is planning for the construction of a new oil refinery on a local site.

The Eagle Saw Works, Chattanooga, Tenn., recently organized, has acquired a local plant and will install equipment for the manufacture of saws. It is headed by F. L. Underwood and J. E. Harris.

The Thompson-Case Oil & Rubber Co., Chattanooga, Tenn., has filed notice of change in name to the Thompson-Case Rubber Co., at the same time increasing its capital to \$50,000 for extensions in its plant to manufacture tires.

The Blue Diamond Mining Co., Centertown, Ky., is planning for the installation of new equipment at its properties, including air compressors and other power apparatus. Robert A. Bridges is vice-president.

W. H. Eason, receiver for the Harvey Steel Products Corporation, Jackson, Tenn., will offer the company's property at a sale on Sept. 28. It is three stories, totaling about 125,000 sq. ft. in floor space.

The Knoxville Fertilizer Co., Knoxville, Tenn., is completing plans for a new plant to cost about \$350,000, including machinery, and will consist of two one-story buildings, 160 x 350 ft., and 100 x 300 ft., respectively. James W. Dean is secretary and treasurer.

The Super-Service Motor Association, Colorado Building, Denver, Colo., has plans under way for the new three-story repair plant and parts manufacturing works, 125 x 250 ft., at Speer Boulevard and Hancock Street, estimated to cost about \$250,000. H. W. J. Edbrooke, Tabor Opera House Building, is architect.

The General Iron Works Co., 1720 California Street, Denver, Colo., has preliminary plans under way for a new brick and steel foundry at Blake and Thirty-third streets, estimated to cost in excess of \$200,000 with equipment.

Seattle

SEATTLE, Sept. 13.

The surplus shipyard stocks have reached in a competitive way into the machine-tool trade, including both heavy-duty and light machines, which constantly get in the way of new sales. Jobbers are asked to make estimates on new machinery, with the discovery later that the business has gone to the shipyard stocks. These surplus stocks, however, are dwindling, and it is becoming increasingly difficult for buyers to get suitable sizes and dimensions.

The sale of manual training machinery for the high schools of the State, which promised last summer to amount to millions of dollars, has been greatly reduced owing to the State-wide demand for tax reductions, and as a consequence the budgets in every high school have been cut.

Among the sales of the week by Seattle jobbers was a complete garage outfit, including an 18-in. Economy Rockford lathe and a No. 3 Toledo press. The demand for machinery has been almost exclusively for garages. The demand for electric drills has exceeded that of any fall season in the past three years. Lathes and small tools are moving into Oriental export.

The Barde Industrial company is preparing to move its offices, warehouse and storage yards to First Avenue, South, and Lander Street. The new warehouse is 114 x 330 ft., one story.

The Gulf States

BIRMINGHAM, Sept. 19.

The Southwestern Portland Cement Co., Los Angeles, Cal., and El Paso, Tex., has acquired about 250 acres at Waco, Tex., and plans the establishment of a new works estimated to cost about \$1,000,000, including machinery. Carl Leonardt is president.

The El Paso Electric Co., El Paso, Tex., has arranged for a note issue of \$750,000, the proceeds to be used for extensions and betterments.

The Plains Lubricating Co., Amarillo, Tex., recently organized, has acquired a local building for the establishment of a plant to manufacture lubricating oils. Equipment will be installed at once. L. S. Lahm is president, and M. E. Lahm, secretary.

Loading and unloading machinery, conveying equipment, etc., will be installed at the new municipal water terminal to be constructed by the City Commission, Tampa, Fla. W. D. Hall, city manager, has submitted plans for the project, calling for an expenditure of \$945,000. A bond issue to total \$1,000,000 is being arranged.

The Christian & Brough Co., Vicksburg, Miss., is completing plans for rebuilding its machine shop, to replace the structure recently destroyed by fire with loss in excess of \$50,000. It will be one-story, 85 x 100 ft. W. A. Stanton, Vicksburg, is architect.

The Cisco Clay & Coal Co., Cisco, Tex., will expend close to \$150,000 for equipment for installation at its new brick manufacturing plant, designed for a daily output of about 50,000 brick. C. B. Bush is president.

The Maryland Refining Co., New Orleans, has acquired a site and will commence the immediate erection of a new oil refinery, estimated to cost in excess of \$500,000 with machinery.

The Common Council, Harlingen, Tex., has approved a bond issue of \$32,000 for the installation of a municipal electric lighting plant. Plans will be prepared at once.

The Treasury Department, Washington, is taking bids up to Oct. 4, for the installation of a new refrigerating plant at the United States Marine Hospital, Key West, Fla. J. A. Wetmore is acting supervising architect.

California

LOS ANGELES, Sept. 13.

The Superior Machine Co., Glendale, Cal., has awarded contract to the Roy L. Kent Co., 130 South Grand Boulevard, for a new one-story plant, 75 x 175 ft., at Colorado Street and San Fernando Road, estimated to cost about \$25,000. Charles B. Morton is manager.

The International Signal Co., Los Angeles, has been incorporated with a capital of \$100,000 by James D. Alcorn, L. C. McAdams and C. O. Baker, to manufacture signal equipment and devices. It is represented by Carl B. Sturzenacker, 227 H. W. Hellman Building.

The Bowman Carriage Co., Sacramento, Cal., has awarded a contract to A. W. Norris, Sacramento, for a one-story machine and repair shop at Twelfth and D streets, estimated to cost about \$25,000.

The Pacific Pipe Co., 201 Howard Street, San Francisco, manufacturer of iron pipe, has plans under way for a new one-story factory at Cypress and Twentieth streets, Oakland, Cal. Construction will be handled by the company under day work.

The Severin Motor Co., Oakland, Cal., formerly of Kansas City, Mo., will soon take bids for the first unit of its new plant at East Fourteenth Street and Fifty-fourth Avenue, one-story, 60 x 450 ft., and estimated to cost about \$100,000. It will be followed by other units in the near future, bringing the cost up to about \$400,000. M. I. Diggs, Easton Building, Oakland, is architect.

The Durant Motor Co. of California, Oakland, Cal., has awarded a contract to the P. J. Walker Co., Monadnock Building, San Francisco, for its new plant at the end of East Fourteenth Street, at the city limits. It will consist of a two-story, reinforced-concrete building, with four wings, totaling 800 x 800 ft., and is estimated to cost about \$750,000. Construction will commence in about 30 days.

The Southern California Edison Co., Los Angeles, has made application to the State Railroad Commission for permission to build a new hydroelectric power plant in the Big Creek section. It will have an initial generating capacity of 70,000-hp., and ultimate capacity of 400,000 hp., and is estimated to cost in excess of \$5,000,000.

The Crystal Ice Co., Long Beach, Cal., has acquired property, 75 x 100 ft., on American Avenue, as a site for a new plant, estimated to cost about \$45,000. C. H. Taylor heads the company.

Canada

TORONTO, Sept. 19.

Dealers report a better demand for machinery. Big lists, however, are still absent, but users are appearing in larger numbers for single tools and equipment for replacement purposes. The equipping of new industrial plants is not being done at present, although there are several announcements of companies preparing to go ahead with the construction of factories, and it is expected that these will be a big factor in a better demand early next year. Users of small tools are buying only what is required for immediate needs, but dealers state that business is all that could be expected under existing conditions. Some reductions in prices have recently been made in machinery and tools ranging from 5 to 15 per cent.

The International Harvester Co., Chatham, Ont., has secured a local building for the manufacture of motor trucks, etc.

The Canadian Gary Motor Truck Co. has secured a building on Atlantic Avenue, Toronto, and will install equipment at once for the manufacture of trucks, etc.

The Sapco Spring Co., Ltd., Cherry and Front Streets, Toronto, will extend its plant and increase the capacity for the manufacture of truck springs, etc.

The Watkins Mfg. Co. of Canada, Ltd., Kingston, Ont., has been incorporated with a capital stock of \$15,000 by James McK. Hughes, William McA. Nickle and others to manufacture machinery, metals and to reabbitt automobiles, marine, traction and other mechanical parts, etc.

The City Council, Montreal, will install new boilers in pumping station on Craig Street, cost \$15,000. Bids will also be called shortly for four new pumps costing \$15,000 for the Rielle street pumping station.

The Universal Cement Casket Co., Dunnville, Ont., is having plans prepared by Barber, Wynne-Roberts & Seymour, 40 Jarvis Street, Toronto, for a factory.

The William Rogers Co., River Street, Niagara Falls, Ont., will build a boiler house to cost \$13,000.

The Kingston General Hospital and Queen's University, Kingston, Ont., will build a power plant.

BOOK REVIEWS

America and the New Era. A Symposium of Social Reconstruction, edited by Elisha M. Friedman. Pages xxx + 500; 5½ by 8 in. Published by E. P. Dutton & Co., New York.

This publication is a grouping together under five general headings of various articles which have appeared from time to time since the armistice and constitutes a sequel to a previous publication entitled "American Problems of Reconstruction, a Symposium on the Economic and Financial Aspects." Altogether it contains twenty-eight articles, two by Mr. Friedman under the head of "Perspectives, Social and Political." The remaining 26 are each from an authoritative source, depending on its nature. There is also a foreword by Secretary of Commerce Herbert Hoover.

Under the head of "Social Progress versus Cycles of Change" five articles are grouped, each with some phase of war as its base, and with discussions on the possibility of lasting peace, including consideration of the "League of Nations." Under the head of "Some Economic Aspects of Social Problems," four articles are grouped dealing with land ownership, overpopulation of the cities at the expense of agriculture, immigration and that development of war which is here termed "Women in Industry."

The remaining articles are grouped, six under the head of "The New Nationalism" and eleven under the head of "The Conservation of Human Resources." This last group is very interesting, since it is largely based on findings made in the handling of the various armies employed in the war. Vocational guidance, industrial hygiene, health conservation, nervous strain and mental hygiene are among the subjects intelligently discussed.

The editing of all this wealth of material and the supplying of brief notes as to the authors are well done. There is an analytical table of contents, a bibliography and an index. E. C. R.

A Record of Ships Built. Under this title the New York Shipbuilding Corporation has issued a beautifully illustrated 64-page brochure, 9 x 12 in., picturing and briefly describing many of the outstanding naval and merchant vessels built at its yard in Camden, N. J., during the past 20 years. In a summary of 265 ships built and now building, the aggregate overall length is given as 88,001 ft., or 16 2/3 miles, and the total power as 1,982,835 hp., a figure raised above 2,000,000 by engines of 19,200 hp. built for hulls constructed in other yards. Prominent in the description are the new Shipping Board passenger liners, designed during the war as transports and changed over after the armistice. The frontispiece shows the superdreadnought Idaho passing up the East River towards the Brooklyn navy yard.

Training Industrial Workers. By Roy Willmarth Kelly. Pages, xxi + 437, 5¼ by 8½ in.; forms and illustrations, 71. Published by Ronald Press Co., New York.

The need of education by those who constitute the rank and file of industry and the necessity of vocational guidance seem to be the reasons which have led to the writing of this book. For, as John M. Brewer, Ph.D., associate professor of education, Howard University, says in an introduction for the book, the question, "Why not try education?" must occur to those who study the human problems of industry.

Setting forth an educational creed for industry and in condensed form covering the complexity of industry, as the kinds of industry, types employed, geographical location, seasonal fluctuations and financial resources, a comprehensive sketch of the earlier forms of apprenticeship is given. The beginnings in modern industrial education and national and state aid for vocational training, together with the development of the possi-

bilities of schools and classes in vocational training, are described.

Thus leading up to the rapid developments in recent years of what is termed a new profession, viz: employment management, a heterogeneous mass of information is given, collected from many of the outstanding industries which have specialized in one or more phases of industrial training. Some mention of plans of factory management and labor management is made, and the fixing of the responsibility for what is termed the "new program" is described.

There are several appendices giving an educational survey of technical schools and classes, the training plans in detail of representative organizations such as the General Electric Co., Westinghouse Electric & Mfg. Co. and others, a classification of industrial schools and training methods and a very complete bibliography. The entire text of the book is conveniently sub-headed, which, together with the index, makes it a very ready reference work. E. C. R.

Quin's Metal Trades Directory of the United Kingdom. Pages 291, 5¼ x 8¼ in. Published by the Metal Information Bureau, Ltd., 7 East India Avenue, London, E.C.3.

This directory represents the first effort to compile a classified list of the non-ferrous metals interests of Great Britain, and the showing is surprising of the number of firms engaged in one or more branches of that trade. Lines represented include, in addition to non-ferrous metals, tin plates, galvanized sheets and a number of iron and steel products. Following the alphabetical section which gives the names and addresses of the various firms is a classified section in which dealers in metals and other products are listed under their respective headings.

New Books Received

Petroleum Laws of All America. By J. W. Thompson. Pages, vii + 645, 6 x 9 in., paper covered. Published by Bureau of Mines, Department of the Interior and obtainable at 40c. per copy from the Superintendent of Documents, Government Printing Office, Washington, D. C.

Railroad Shop Practice. By Frank A. Stanley. Pages, xii + 331, 6 x 9 in.; illustrations, 391. Published by the McGraw-Hill Book Co., 370 Seventh Avenue, New York.

Drawing Room Practice. By Frank A. Stanley. Pages, x + 253, 6 x 9 in.; illustrations, 487. Published by the McGraw-Hill Book Co., 370 Seventh Avenue, New York.

Analytical Mechanics for Engineers. By Fred B. Seely and Newton E. Ensign. Pages, xiv + 486, 6 x 9 in.; 454 illustrations. Published by John Wiley & Sons, Inc., 432 Fourth Avenue, New York.

Bituminous coal produced up to Sept. 10 is estimated by the United States Geological Survey at 271,716,000 net tons, compared with 365,081,000 tons for the same period last year. Weekly output has been lower, every week since the middle of February, than the output for the corresponding week of 1920, 1919, 1918 or 1917.

Directors of the Youngstown Sheet & Tube Co., Sept. 13, declared a dividend of 50c. a share on the common stock, and the regular dividend of \$1.75 on preferred, both payable Oct. 1 to holders of record Sept. 20. Officials announced that the dividends would be paid out of surplus.

Notices have been posted at the plants of American Sheet & Tin Plate Co. of a cut in wages of skilled workmen of 12 per cent in hot mill workmen and 7 per cent in tin house workmen. This reduction merely is in keeping with the recent revision made in union mills, based upon the bi-monthly sales average and upon which the American Sheet & Tin Plate Co. wage scales are based.

Current Metal Prices

On Small Lots, Delivered from Merchants' Stocks, New York City

The quotations given below are for small lots, as sold from stores in New York City by merchants carrying stocks.

As there are many consumers whose requirements are not sufficiently heavy to warrant their placing orders with manufacturers or shipment in carload lots from mills, these prices are given for their convenience.

On a number of articles the base price only is given, it being impossible to name every size.

The wholesale prices at which large lots are sold by manufacturers for direct shipment from mills are given in the market reports appearing in a preceding part of THE IRON AGE under the general heading of "Iron and Steel Markets" and "Non-ferrous Metals."

Iron and Soft Steel Bars and Shapes

Bars:	Per Lb.
Refined bars, base price	2.78c.
Swedish bars, base price	10.00c.
Soft steel bars, base price	2.78c.
Hoops, base price	3.88c.
Bands, base price	3.43c.
Beams and channels, angles and tees	
3 in. x 1/4 in. and larger, base	2.88c.
Channels, angles and tees under 3 in. x	
1/4 in., base	2.78c.

Merchant Steel

	Per Lb.
Tire, 1 1/2 x 1/2 in. and larger	2.75c.
(Smooth finish, 1 to 2 1/2 x 1/4 in. and larger) ..	2.95c.
Toe calk, 1/2 x 3/4 in. and larger	3.45c.
Cold-rolled strip, soft and quarter hard ..	10.00c. to 10.50c.
Open-hearth spring steel	4.25c. to 6.00c.
Shafting and Screw Stock:	
Rounds	4.38c. to 4.53c.
Squares, flats and hex	4.98c. to 5.03c.
Standard cast steel, base price	14.00c.
Extra cast steel	17.00c.
Special cast steel	22.00c.

Tank Plates—Steel

1/4 in. and heavier	2.88c.
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Sheets

Blue Annealed

	Per Lb.
No. 10	3.28c. to 3.53c.
No. 12	3.33c. to 3.58c.
No. 14	3.38c. to 3.63c.
No. 16	3.48c. to 3.73c.

Box Annealed—Black

	Soft Steel C. R. One Pass Per Lb.	Blued Stove Pipe Sheet. Per Lb.
Nos. 18 to 20	3.80c. to 4.05c.	.....
Nos. 22 and 24	3.85c. to 4.10c.	4.50c.
No. 26	3.90c. to 4.15c.	4.55c.
No. 28	4.00c. to 4.25c.	4.65c.
No. 30	4.25c. to 4.50c.	.....
No. 28, 36 in. wide, 10c. higher.		

Galvanized

	Per Lb.
No. 14	3.90c. to 4.10c.
No. 16	4.05c. to 4.25c.
Nos. 18 and 20	4.15c. to 4.40c.
Nos. 22 and 24	4.30c. to 4.55c.
No. 26	4.45c. to 4.70c.
No. 27	4.60c. to 4.85c.
No. 28	4.75c. to 5.00c.
No. 30	5.25c. to 5.50c.
No. 28, 36 in. wide, 20c. higher.	

Welded Pipe

Standard Steel	Black Galv.	Wrought Iron	Black Galv.
1/2 in. Butt.	—55 —40	3/4 in. Butt.	—30 —13
3/4 in. Butt.	—60 —46	1-1/2 in. Butt.	—32 —15
1-3 in. Butt.	—62 —49	2 in. Lap.	—27 —10
3 1/2-6 in. Lap.	—59 —45	2 1/2-6 in. Lap.	—30 —15
7-8 in. Lap.	—55 —41	7-12 in. Lap.	—23 —7
7-12 in. Lap.	—54 —40		

Steel Wire

	Per Lb.
Bright basic	4.00c.
Annealed soft	4.00c.
Galvanized annealed	4.75c.
Coppered basic	4.50c.
Tinned soft Bessemer	6.00c.

*Regular extras for lighter gages.

Brass Sheet, Rod, Tube and Wire

BASE PRICE

High brass sheet	15 1/4 c. to 18 1/4 c.
High brass wire	16 1/4 c. to 20 1/4 c.
Brass rod	13 1/4 c. to 19 1/4 c.
Brass tube, brazed	26 1/2 c. to 30 1/2 c.
Brass tube, seamless	18 c. to 19 1/2 c.
Copper tube, seamless	19 1/2 c. to 21 1/4 c.

Copper Sheets

Sheet copper, hot rolled, 24 oz., 19 1/2 c. to 22 1/2 c. per lb. base.
Cold rolled, 14 oz. and heavier, 2c. per lb. advance over hot rolled.

Tin Plates

Bright Tin	Grade	Grade	Coke—14-20	Primes Western
	"AAA"	"A"	80 lb.	\$6.80 \$6.55
	Charcoal	Charcoal	90 lb.	6.90 6.65
	14x20	14x20	100 lb.	7.00 6.75
IC.	\$10.60	\$9.50	IC.	7.20 6.95
IX.	11.80	10.75	IX.	8.10 7.85
IXX.	13.60	12.25	IXX.	9.10 8.85
IXXX.	15.60	14.25	IXXX.	10.50 10.25
IXXXX.	17.20	16.00	IXXXX.	11.50 11.25

Terne Plates

8-lb. Coating 14 x 20

100 lb.	\$7.50
IC	7.75
IX	8.00
Fire door stock	11.00

Tin

Straits pig	28c.
Bar	34c. to 35c.

Copper

Lake ingot	15c.
Electrolytic	15c.
Casting	15c.

Spelter and Sheet Zinc

Western spelter	6c. to 6 1/4 c.
Sheet zinc, No. 9 base, casks	11 1/2 c. open 12c.

Lead and Solder*

American pig lead	5 1/2 c. to 6c.
Bar lead	6 1/4 c. to 7c.
Solder, 1/2 and 1/2 guaranteed	20 1/4 c.
No. 1 solder	18 1/4 c.
Refined solder	15 1/4 c.

*Prices of solder indicated by private brand vary according to composition.

Babbitt Metal

Best grade, per lb.	80c.
Commercial grade, per lb.	40c.
Grade D, per lb.	35c.

Antimony

Asiatic	6c. to 6 1/4 c.
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Aluminum

No. 1 aluminum (guaranteed over 99 per cent pure), in ingots for remelting, per lb.	29c. to 31c.
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Old Metals

The market is firmer with a tendency toward higher prices. Dealers' buying prices are nominally as follows:

	Cents Per Lb.
Copper, heavy and crucible	10.00
Copper, heavy and wire	9.00
Copper, light and bottoms	7.75
Brass, heavy	4.75
Brass, light	3.75
Heavy machine composition	7.50
No. 1 yellow brass turnings	4.25
No. 1 red brass or composition turnings	6.50
Lead, heavy	3.75
Lead, tea	2.50
Zinc	2.50

